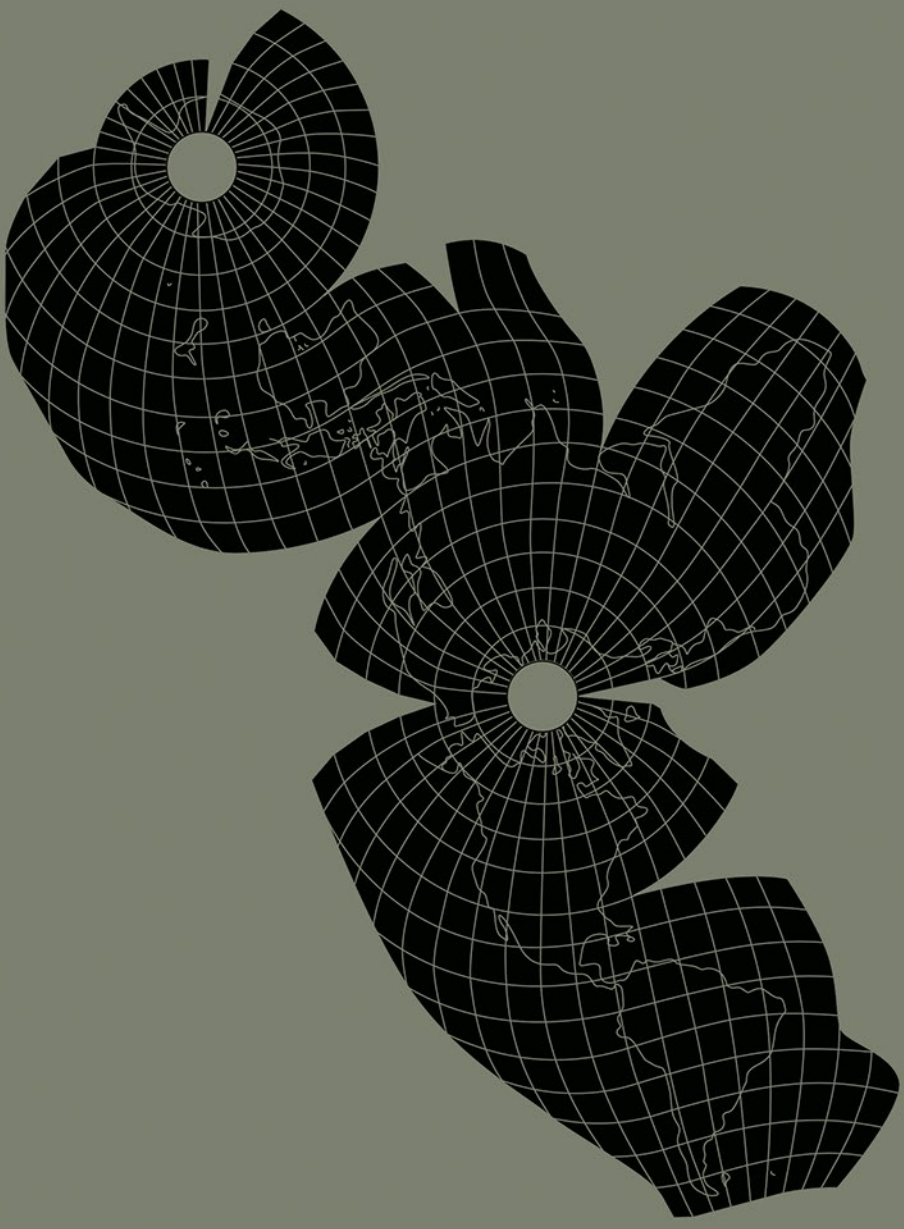
CHRISTINE SCHRANZ (ED.)

SHIFTS IN MAPPING

MAPS AS A TOOL OF KNOWLEDGE



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ALVAREZ-MARIN

FIG.1: Hessels, Scott and Gabriel Dunne. Low Earth Orbiting Satellite Trajectories from "Celestial Mechanics," 2005. http://www.visualcomplexity.com/
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FIG.5: Source: Anti-Eviction Mapping Project; Open Street Maps tiles.

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FIG.1-3: Source: http://www.radicalcartography.net/index.html?suicide (accessed January 6, 2021).
FIG.4: Source: https://journals.openedition.org/cybergeo/32949#illustrations (accessed January 6, 2021).
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SCHRANZ

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FIG.4: Source: Getty Images.
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FIG.8-11: © IXDM Christine Schranz, Source: https://palmyra.ixdm.ch.

SCHNEIDER

FIG.1: Graphic: Birgit Schneider.
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FIG.1: © Courtesy bureau d'études, 2006.
FIG.2: © Courtesy bureau d'études, 2019.

REKACEWICZ

FIG.1: Source: Wikimedia commons https://commons.wikimedia.org/wiki/File:Cantino_planisphere_(1502).jpg
FIG.2: Institute for applied autonomy, New York, 2001.
FIG.3: Source: https://digital.library.cornell.edu/catalog/ss:19343517
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PREFACE

The title of this publication "Shifts in Mapping. Maps as a Tool of Knowledge" began life as an online Symposium of the same name, which was organized by the FHNW Academy of Art and Design in Basel, Switzerland on January 20 and 21, 2021. Complementary to this Symposium, an Exhibition "Shaping the Invisible World" at HeK (House of Electronic Arts Basel), Switzerland took place between March 3 and May 23. The jointly conceived formats involved an inquiry into cartography and the representation of the world as a tool between knowledge and technology. The events aimed to shed light on our fascination with maps in order to highlight the tension between counter-maps and hegemonic top-down approaches of IT companies. With Web 2.0, and the possibility of generating one's own maps, the map is gaining enormous ground in terms of its importance as a knowledge tool. This aspect necessitated a focus on issues of democratization, access, and technology.

This book is the product of design researcher Dr. Christine Schranz. Furthermore, it was inspired by the collaboration with HeK (House of Electronic Arts Basel) and the Exhibition's joint curation with Boris Magrini. This book has been organized into two parts:

Part I
contains essays written from the ground up, originally initiated at the Shifts in Mapping Symposium and which are the result of further exchange and research.

Part II
is dedicated to the Exhibition Shaping the Invisible World, which was an integral part of the Symposium and further artistic research into bottom-up, counter, and critical mapping and mapmaking.

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RESEARCH INTEREST

The topic of maps and mapping and the initiative for the Symposium, Exhibition, and this publication stems from Christine Schranz's research interest which has been an ongoing theme throughout her teaching, research projects, and her practice as a professional designer and researcher for many years. Two research projects in particular were central to the conception of this publication and the formats of the Symposium and Exhibition on which it is based:

First, an SNSF-funded international research visit at the Winchester School of Art, University of Southampton, and the project "A Journey to Palmyra" at the Institute of Experimental Design and Media Cultures (IXDM) in 2018.

The project's intention was to explore an inaccessible location through the remaining semantic information left on the Internet. In doing this research, she asked herself: "What is the digital mind of Palmyra?" The war-torn country of Syria can be explored on the Internet, even as it remains unreachable in the 'real world'. Its infrastructure is visible, but most of it has been damaged or is controlled by various interest groups. The Internet has become an unregulated space; Google and others decide on how this public space is perceived through their map services.

→SEE ALSO THE CONTRIBUTION BY CHRISTINE SCHRANZ, PAGE 125

Second, inspiration was drawn from an SNSF-funded research project "Augmented Space" at the Institute of Experimental Design and Media Cultures (IXDM) from 2015-2019, and its resulting book publication: "Augmented Spaces and Maps. Das Design von kartenbasierten Interfaces", which was published in 2020 by Birkhäuser Verlag Basel and which is available for download in German as an open-access publication.

The research project is based on the assumption that knowledge and its production in digital cultures is spatially organized, structured, formed, and received. It investigates how a

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place's visibility and legibility are changed and reconfigured by the use of interactive and locative media technologies. The design practice and the end-user are central in this inquiry: How does the user orient himself in these hybrid spaces and what are the effects of this kind of knowledge production on spatial navigation and reception?

The book is an introduction to the field of digital cartographies. It sketches out important influences, theories, and approaches and, with contemporary design and artistic project examples, represents how map-based interfaces might function. These sketches also offer inspiration for critical and experimental approaches that are relevant for both designers and other practitioners in the field. Furthermore, it laid the foundation for the Symposium and Exhibition presented in this publication.

The Symposium "Shifts in Mapping" and the Exhibition "Shaping the Invisible World" were grounded in the aforementioned works. The Exhibition was developed in cooperation with HeK (House of Electronic Arts Basel) and was co-curated with Boris Magrini.

→SEE ALSO THE CONTRIBUTION BY
BORIS MAGRINI, PAGE 241

The planning and implementation of this jointly conceived format challenged us during this special, pandemic-stricken year. Thus, the Exhibition and the Symposium first had to be postponed, but were then partly adapted into online events. However, this exceptional year also allowed us to be creative and to develop formats that would not have been created without the restrictions in place during 2020. In addition, the live streams of the Symposium and of the Exhibition's online opening allowed us to reach many more people than we could have ever hoped for.

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ON THE SYMPOSIUM AND EXHIBITION

Symposium

The online Symposium "Shifts in Mapping" brought together renowned scientists, activists, artists, and designers who all worked in a broad context of cartography, in the fields of media studies, art, and design. The Symposium's aim was to discuss current positions, projects, concepts, and methods around cartography and the medium of the map and to place them in a larger context. At the same time, the Symposium promoted a dialog between science, art, design, and technology. The online event was aimed at both academic and non-academic audiences and enabled an exchange from an interdisciplinary and holistic perspective.

Spread over two days, different formats were presented, which were characterized by subversive, artistic, critical, and/or political approaches. The event included lecture contributions by Kollektiv orangotango (Severin Halder and Paul Schweizer), Birgit Schneider, Philippe Rekacewicz, Ulrike Felsing and Max Frischknecht, bureau d'études (Léonore Bonaccini and Xavier Fourt), and Diana Alvarez-Marin. Their engagement and contributions resulted in this book's collection of thoughtful and peer-reviewed papers. The speakers' contributions provide this publication's basis and theoretical framework and can be found in the essay section.

More than 1,200 participants from all over the world attended the online Symposium via live streaming. Their active participation, questions, and engagement were invaluable. As such, the Symposium offered a lively platform for interdisciplinary discussion and critical thinking for both practice and research. Furthermore, the Symposium represented a contribution to digital cartography by considering the design / artistic elements at play, technological discussions, and processes and by promoting a dialog between science, art, design, and technology. Both the medium and the practice

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of mapping were critically discussed and were developed and elaborated within a mostly digital context.

A complementary approach, from a critical and artistic perspective, was presented as a collection of artworks during the Exhibition "Shaping the Invisible World".

Exhibition

The Exhibition "Shaping the Invisible World" examines cartography as a tool between knowledge and technology. The Exhibition presents a selection of artists who use cartographic strategies and location technologies to discuss geopolitical contexts, to uncover hidden worlds, and unknown realities.

Artists: Studio Above&Below, Tega Brain & Julian Oliver & Bengt Sjölén, James Bridle, Persijn Broersen & Margit Lukács, bureau d'études/Collectif Planète Laboratoire, fabric|ch, Fei Jun, Total Refusal (Robin Klengel & Leonhard Müllner), Trevor Paglen, Esther Polak & Ivar Van Bekkum, Quadrature, Jakob Kudsk Steensen.

An overview of the Exhibition and the exhibited artists can be found in the Exhibition section of this publication.

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ACKNOWLEDGMENTS

As the editor of this book, organizer of the Symposium, and co-curator of the Exhibition, I would like to express my sincere gratitude to all of those who contributed in such rich and inspiring ways to its successful outcome.

First of all, huge thanks is owed to the text's contributors and to the artists who participated in this book. This book would not have been possible without their engagement and effort. Furthermore, I would like to thank Offshore Studio, Isabel Seiffert, and Christoph Miller for the great design, and Sean O' Dubhghaill for the thoughtful editing.

Secondly, I am deeply indebted to several people at the FHNW Academy of Art and Design, who contributed with great commitment and dedication to the success of the online Symposium. A special thanks to Maria Smigielska, Charleen Elberskirch, Marco Mastrogiacomo and Suresh Surenthiran.

Thirdly, I would like to thank HeK (House of Electronic Arts Basel) for opening the museum and for the joint realization of an inspiring Exhibition, especially my co-curator Boris Magrini and the director Sabine Himmelsbach as well as the entire team for the great support and the trust.

Finally, I would like to extend my warmest thanks to the Swiss National Science Foundation (SNSF), which generously co-financed this publication and the online Symposium.

Basel, April 2021
Christine Schranz

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I
SHIFTS IN MAPPING

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Introduction to the essay section

SHIFTS IN MAPPING – TWO CONCEPTS WHICH HAVE CHANGED THE WORLD VIEW

by Christine Schranz

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“Cartography is Dead (Thank God!)” (Wood 2003)

The provocative statement, provided above, by American geographer and artist Denis Wood refers to traditional mapmaking as well as to an increasing academization of cartography. Wood squared off against the discipline: “Cartographers played a significant role in making the world safe for colonizers, mining conglomerates, and the military” (Wood 2003: 7). However, alternative maps and mapping strategies became possible alongside the replacement of the map as a spatial representation by elites (such as state institutions), as well as maps falling into favor among new technologies like GIS, satellite images, and open data politics. Along with critical cartography, this publication highlights alternative forms of mapmaking and is dedicated to new forms of geographical knowledge producers.

The following introduction first reviews the far-reaching upheavals, from different perspectives, and cites the cartographic merits of non-cartographers, such as designers, artists, activists, or visionaries. The peer-reviewed papers, found in the essay section, point to numerous shifts throughout the discipline of cartography, as well as within the medium of the map itself.

TECHNOLOGICAL SHIFTS

One initial groundbreaking shift concerns the increased access to online map resources and the empowerment to generate one’s own digital maps. On the one hand, digital maps have brought surveillance and coercion (Google has knowledge not only about who we are, but also where we are); on the other hand, these maps have also enabled greater democracy, plurality, and empowerment.

Digital maps have replaced centuries-old neutral spatial order with a subjective perspective. Instead of a static printed map, which we need to keep track of while navigat-

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ing in space, digital maps put us in the central position and follow us wherever we move. This has led to an egocentric view of the world, displacing the dominance of an allocentric or Eurocentric perspective.

Maps are increasingly being controlled by private internet companies in digital cultures, such as Alphabet (Google Maps) or Microsoft (Bing), thereby diminishing state institutions, such as the National Geographic Society, which were previously responsible for map services. Google's cartography empire now includes everything from a planetary view with Google Sky View to an eye-level view of Google Street Map. The most widely used map worldwide is Google Maps.

This shift in geographical practice entails far-reaching changes and consequences. The main concern here is the question of authorship of maps in the broadest sense (internet companies as well as computer scientists, prosumers, and, in the long term, increasingly algorithms or machines); conversely, this has been accompanied by greater concerns over map design and maps' contents in connection with those same aforementioned internet companies and technologies behind them.

Today, progress in these fields is primarily generated by IT companies who dramatically change our vision of the world, the way we communicate, navigate, and consume globally. This progress also affects our own positioning within the integrated, economic, and political systems of communication. Digital maps are increasingly being used for political and economic manipulation; this occurs alongside the democratization of map production.

CONCEPTUAL SHIFTS

A second groundbreaking shift can be found in maps as objects of discourses and a radical change that took place within geography as a discipline.

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Several movements have leveled critiques against existing, prevailing cartographies and practices since the release of John Brian Harley's work in the late 1980s (1989, 2001), namely critical geography (also known by the term Human Geography in English-speaking areas, e.g. Harvey 1990 among others); other terms from these sub-disciplines include critical cartography, radical cartography, or counter-mapping. There has been an increase in the degree to which maps are questioned as an expression of hegemony, control, and power (for Power see also Brotton 2012; Marshall 2017 among others). A map design that serves elites and that defines universally valid rules and norms has also been increasingly questioned and criticized. Several other things have been criticized, including the marginalization and generalization of the map's contents or the standard Mercator projection, which is based on a Eurocentric view of the world.

Geographers, cartographers, and historians – as exemplified by the aforementioned David Harvey, J. B. Harley, Jerry Brotton, or others like Mark Monmonier, Gillian Rose, and Nancy Peluso, for example – have acknowledged that any representation of reality is mostly distorted through the process of geometric projection, becomes marginalized, and can even become a construction guided by hidden interests. As such, the only truth about the maps that we can draw from these statements is that they represent a perspective that has long been dominated by a male, white, European view.

Thus, maps are not an objective tool, but are instead an expression of power, self-interest, and political ideologies of

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their knowledge producers. Donna Haraway also calls this dictum "master subject" (1991, see Rose 1993: 6). Neutrality results from the diversity of viewpoints. The majority of the rules of mapping were set by men.

The development of Web 2.0, (i.e., participative websites with a greater share of user-generated content) has led to the democratization of geodata. Through mashups (a combination of text, image, and audio with map data), it has become theoretically possible for anyone to design, share, or distribute their own maps.

However, there persists a schism between proprietary and open data. Even if Google Maps remains the dominant web mapping service, several alternatives do exist in the form of Volunteered Geographic Information (VGI). The content of these VGI maps is based on open tools and Open Data Commons and places a strong emphasis on crowd content and user-generated data.

SPATIAL CARTOGRAPHIC THINKING

Georeferenced content has not only changed the way in which we deal with space, but it has also paradigmatically elevated the map to the interface between humans and computers (or systems) and space. With the launch of Google Maps (2004, developers Lars and Jens Rasmussen), it became possible to link a database to a cartographic interface (or system), as former Google Maps product manager Lior Ron concisely puts it: "From Google Maps to Google on maps."

The invention of Earth Viewer, by the company Keyhole (2001, founder Michael T. Jones), marked a radical change in spatial cartographic thinking and in the world's representation. Google bought the company in 2004, and the software was renamed Google Earth. With this software, satellite images were combined with

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cartographic data for the very first time and, at the same time, this information was linked with GIS data (various data formats to process geographical information).

The concept of continuous zooming in Google Earth is based on the central design element of the short film "Powers of Ten" (USA 1977), directed by Charles Eames & Ray Eames. The video's narrative starts with the human scale of a couple relaxing in a park and goes through different scales, between the planetary and the microscopic. In the process, the film passes through a total of ten powers, six into space as well as into the atmosphere and four into the inside of the body.[1] The film shows the journey through galaxies within seven minutes in an amazingly technical way, for the time at which it was made, the phenomenon of stepless, continuously zooming into a micro- and macrocosm respectively.

To achieve a similar effect, Keyhole combined satellite imagery and computer graphics to zoom back and forth between Earth and space very quickly and seamlessly. The principle of infinite zooming calls the idea of distance into question and users literally feel as though they are flying as they zoom.

Satellite imagery has not only revolutionized cartography, by making it easily accessible, but it has also made it more accessible (and in this sense more democratic). Furthermore, this shift has brought novel spatial practices into focus. Satellite imagery gained notoriety during the Gulf War, for example, when the invasion of American troops could be tracked worldwide via satellite data. Nowadays, satellite images are used as a source for reconnaissance, especially where geopolitical crises or wars have made on-site inspection impossible, such as in Syria.

This form of data collection and analysis has become known through the research group Forensic Architecture, but also in an art

01 https://www.youtube.com/watch?v=0fKBhvDjuy0 k.

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context, through “Zone*Interdite” (since 2000) by Christoph Wachter and Mathias Jud or “Terminal Air” (2007) by Trevor Paglen for example.

A MEDIA-INFLUENCED, CONSTRUCTED WORLD

The changes in the production of map material and the authorship of geodata also created (new) inequalities and hegemonies. For the first time, an Internet company was responsible for the medialized image or for the cartographic representation of the world with Google Maps – again, the most frequently used map in the world.

Behind these new cartographers lay the monopolization and centralization of data through Google.

This shift in power forces has been critically described by British historian Jerry Brotton, who points out: “For the first time in recorded history, a world view is being constructed according to information which is not publicly and freely available. All prior methods of mapmaking ultimately disclosed their techniques and sources, even if, as in the case of sixteenth- and seventeenth-century mapmaking, they tried but failed to withhold its detail from their competitors.” (Brotton 2012: 431f)

To put it bluntly, today's maps are media-influenced constructed worlds and this means that, ultimately, Google decides how public space is perceived. The criteria on which the selection on Google Maps is based are unclear: this includes whether or not one is visible on a map, and what the financial conditions for such visibility are.

This generates both problems of inclusion and exclusion and it is unclear if the platform allows certain information to appear on maps (for example, whether a restaurant is displayed or not).

The internet geographers Graham & Zook have also spoken about “selective visibility” in this context: they found that a restaurant search

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in Tel Aviv on Google Maps yields different results depending on the language setting (English, Hebrew, or Arabic). The results might be affected by the number of hits whereas the selection of restaurants shown (and the order in which they appear) is significantly different (Graham & Zook 2013).

The authors of the study also speak about digital imperialism in this context: "Internet content, sorting algorithms and platforms, and common online practices all serve to reinforce the visibility of the already highly visible, and make peripheral voices more marginal." (Graham & Zook 2007, quoted in Graham & Zook 2013: 79)

If today's maps are a result of indexed geoweb content from Google Maps, then this means that as a consequence the amount of indexed material shapes the way places are visible, perceived, and even experienced. Maps have always been selective, but the selection did not depend on a single private company, but instead the result of the process of negotiation and production of several institutions and multiple cartographers worldwide.

When information, in the form of maps, becomes increasingly accessible and widespread, the question of its truthfulness also quickly comes to the fore. This entails not only a democratization of its access and use, but also a civic responsibility for active participation and a disclosure of map-making processes. What is the ethical status of the map itself? Should maps be a central and general infrastructure or a network-like constellation, so as to empower communities and individuals?

The ceding of geographic responsibility to private companies can have tangible politico-military consequences, such as in the case of unclear borderlines, which are displayed differently depending on

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the country from which the Google map is accessed (e.g., India, Pakistan, Bhutan, China, Russia, Ukraine). In 2018, one such unclear border depiction almost triggered armed conflict between Nicaragua and Costa Rica when soldiers of the Nicaraguan army occupied a natural reserve on an island belonging to Costa Rica, but which had been marked on Google Maps as belonging to Nicaragua. The conflict was only averted by the issuing of an apology from Google.

There are multiple examples of Google Maps being associated with a border dispute. However, what is remarkable about the above example is that the internet company, as the author of the map, was required to publicly apologize for its mistake and to accept responsibility for it.

CRITICAL CARTOGRAPHY

Initial pre-critical cartographic approaches were visible as early as in 1943, with two remarkable maps: the "Dymaxion Map" by the American designer and architect Richard Buckminster Fuller (1895-1983) and the "América Invertida" by the Uruguayan-Spanish artist Joaquín Torres García (1874-1949). Both of these maps radically challenged the common view of the world by questioning and changing projection, orientation, and representation methods. Fuller, for example was convinced that it was possible to design a universally valid map, one that was not based on cultural and/or elitist constructs; after all, the history of cartography reflects centuries of European supremacy with Europe acting as the central continent. The "Dymaxion Map" (Dynamic Maximum Tension or Ion) shows the world as a continuous surface, inasmuch as is possible, without distorting the size and shape of the land masses

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and with the separation of the continents, surrounded by the oceans. Fuller used 20 triangles that could be assembled along the edges to form a three-dimensional polygon (tetrahedron) in order to obtain a projection of the globe that was as free of distortion as possible.

The rise of critical cartography in the late 1980s, coupled with postcolonial studies, led to new approaches in map-making which were the result of the questioning of the established norms of maps perceived as an expression of hegemony, control, and power oriented towards elites and the Eurocentric world view. Critical cartography has become a means by which to resist authorities. It led to the production of counter-maps, alternatively called critical maps, radical maps, or deep maps (Pearson/Shanks 2001; Bodenhamer/Corrigan/Harris 2015 among others) which allowed for the development of a new awareness of geographic, social, and political realities through participation, appropriation, and counter-knowledge.

The term counter-mapping was first introduced in 1995 by American Sociologist Nancy Peluso in her article "Whose Woods are These? Counter-Mapping Forest Territories in Kalimantan, Indonesia" (2011). Peluso argues that every map has a political dimension and justifies this through the fact that, for example, cadastral maps provide information about ownership (e.g., forest boundaries).

Counter-maps bring alternative forms of mapping when compared to traditional maps. Common to these approaches is the attempt/desire to reveal deeper power structures, to address the social dimension of a map, and to enable democratic access—these maps are an essential tool for asserting socially disadvantaged people's rights. Map production began to shift from what, at first glance, appeared to be an activity of objectification to a subjective task. In this context, questions of democratization, the author of geographical knowledge,

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and an individualized map come into focus, thereby questioning centuries-old models of standardization.

Suddenly, there was no longer anything such as a normalized world, but instead there were many possible worlds. This fragmentation into multiple perspectives became one of modernity's defining principles. The one world–our world is shaped for one's subjective needs and criteria, and one's own subject is located within it.

This ontologically shaped worldview can be found in the numerous maps that were produced after the 1980s. The questions/demands on the map/cartography shift towards existence, materiality, and collectivity. What possible world do we want to live in? What worlds draw their raison d'être from what? What is the nature of a world in which many worlds are supposed to fit?

KNOWLEDGE ACCESS AND PRODUCTION

The exponential increase in georeferenced content (since Web 2.0) has enabled new possibilities of access to knowledge and has led to new methods of knowledge production (visual epistemologies).

The map (as well as graphs, diagrams, and visual forms of representations) has become the basis for this shift and is characterized by the fact that it is used to visualize and negotiate important social issues (see also Drucker 2014, Tufte 2004, 2001 among others). Mapping in this case is used as a creative-artistic activity and research intention.

Accordingly, mapping plays a central role in both artists' and designers' work. Designers and artists use the data in two ways: 1) either to visualize them through infographics and diagrams or 2) they can actively create new approaches to accessing data and information.

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Early forms of knowledge access and production can be found in the maps drawn by the American artist Mark Lombardi (1951-2000) or by the German artist Hans Haacke. Both of these artists created explosive cartographies that point to interconnections and scandals in the worlds of business and politics, all without the Internet's help and in meticulously analogical ways.

Haacke investigated the ownership of neglected real estate in New York by using cadastral plans and visual fragments. It is speculated that the owner–the Shapolsky et al. Manhattan Real Estate Holdings has connections to the Guggenheim Museum. Haacke's work was supposed to be exhibited at that same Museum, but it was cancelled at the last minute. There were speculations that this cancellation happened because his work contained uncomfortable information about real estate ownership. With "Shapolsky et al. Manhattan Real Estate Holdings, A Real-Time Social System, as of May 1" (1971) Haacke documented real estate ownership data and the control that was held over large areas of the city, Harlem and the Lower East Side in particular.

The entire work consisted of 142 photographs of buildings, all of which were labeled with different information: Address, type of building, date of acquisition, transactions, owner, as well as estimated value.

Lombardi pursued a similar approach with even more explosive content with the project "BCCI, ICIC & FAB" (1972-1991). The acronyms in the title refer to banks counted among the environment of international terrorism, such as the Bank of Credit and Commerce International. He showed the entanglements and the corruption between business, politics, and the military through meticulously researched information presented through the use of lines, circles, and arrows.

The narrative maps–or perhaps one should rather speak of diagrams–illustrate, through the politically and economically directed world order,

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all through the use of the simplest technique (pens on paper). They show a network of money, power, and relationships (e.g., those of the Bush and Bin Laden families) and are an image of an elitist world. Lombardi himself speaks of narrative structures, including information that he has compiled from books and articles and which he then put into a visual form. The otherwise isolated information is placed in an overall different context by using diagrams and connections and can, thus, be read anew. Individually, the information would hardly make sense; only in this context could these relations be made.

Access to information plays a central role in digital cultures. This has been accompanied by a shift from local to global or universal knowledge. Mapping, as an artistic and design research and medial process, is currently one of the most used strategies to show, negotiate, and to document critical social processes and knowledge (see for example Bianchi/Folie 1997; Harmon 2004; Abrams & Hall 2008; Harmon 2009; Obrist 2014, Hawkins 2021 et. al. Maps are an expression of visual cultures and allow a methodological and epistemological access to space. Furthermore, they offer the possibility to bring data and information into spatial contexts and to establish new relations.

Interactive maps link their content with information, news, and images as lists, websites, and photographs, thereby becoming spatial organizations—a geo-web of visual epistemologies. The physical place can be inscribed with users' personal notes, stories, and images (inscribing and tagging) through services, networks, and applications.

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These practices, which originated in artistic practices around locative media, are now also being applied to social networks. Maps become visual forms of knowledge production that produce, expand, and make experiences of the world more understandable.

THE ESSAYS

The collection of essays consists of seven groundbreaking positions, all of which contextualize the above topic/shift from a subversive, artistic, critical and/or political approach. The aim of this publication and the essay section is a differentiated examination of the medium of mapping (i.e., the cultural technique of mapping in the context of technology, data, power, and authorship respectively). The authors are activists and geographers, informational and graphic designers, media scientists, architects, as well as artists. This diversity has allowed for the provision of a holistic overview of a highly complex and timely topic.

The essays address the aforementioned shifts from a wide variety of perspectives and, there-fore, represent points of reference to the current design-artistic and technological discussions and digital processes surrounding maps or cartography. They are clustered into three subtopics:

1. New technological processes and democratization in map production;
2. Critical cartography and bottom-up movements;
3. Artistic practice and the social dimension of maps.

The collection of essays in this book will hopefully provide further opportunities for thinking and will also provide a critical approach to the view of this world. It aims to inspire thinking outside the box in order to imagine a new possible world, hierarchies, and technologies.

→VIDEO LINK

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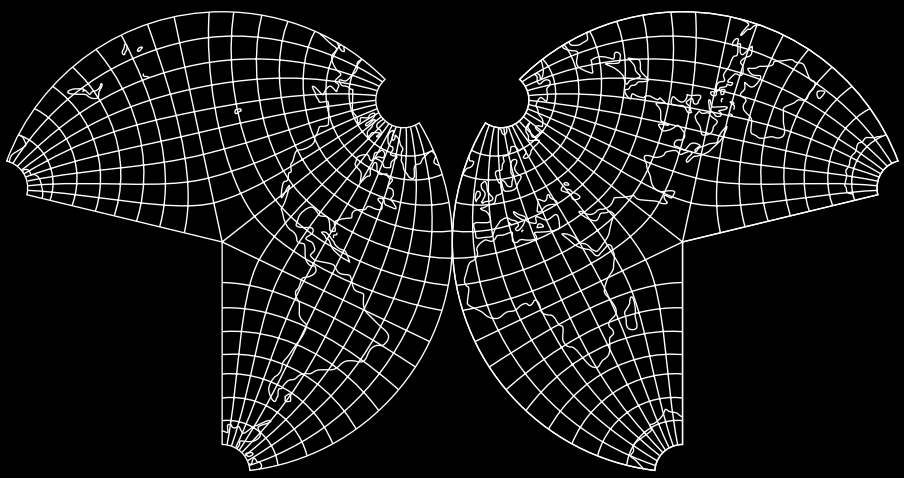
ATLAS OF INDEXICAL CITIES:



Diana Alvarez-Marin

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A Personal Search Engine for the World

Pervasive mobile computing, abundant available urban data, and established ideas of quantum physics have become our familiar, contemporary landscape. This decentralizing dynamic invokes a situation in which not only does the number of infrastructural artefacts exceed the number of users, but it also has an influence on a global, planetary scale. Can we still call the former objects, and the people who use them, subjects? Who is observing and what is being observed? How are the local and the global entangled? The role played by the observer seems to be largely absent in urban theory, even considering the Observer Effect – in which the mere observation of a phenomenon inevitably changes that phenomenon – given that urban theory remains grounded in the production of generic systems that operate with specific data, under the assumption of a pre-existent general logic to cities.

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What happens when we invert this setup and assume that personal (and even ephemeral) city models can be articulated by an active observer (the citizen) and enacted with generic data as a substrate for infrastructures? Can generic infrastructures be informed as personalized instruments by and for an observer? To illustrate this question, I will proceed with an adventurous attempt for a personal search engine for the planet. This navigation instrument, proper to our time, will expose us to familiarity and otherness simultaneously: It will learn from what we know and project it on what is yet-to-know for us, turning it into something that can be "re-membered", placed together again. Such an instrument allows us to navigate through n-dimensional spaces of the hard and soft aspects of a city – spaces, places, and events – while providing a spectrum of the most suitable articulations for a specific active subject or observer.

Unlike Google's search engine, for which subject and context are known, this instrument can be enacted by a multiplicity of avatars, where an active subject can impersonate many personas. Each of these models is a projection from which another projection might unfold, until ultimately it constitutes the narrative of a more extensive atlas of atlases. These stories not only showcase a multiplicity of personal projections about cities, but also expose diverse ways of navigating the city as a probability space. Navigation itself affirms the brand of the active subject, her world, and her Atlas of Indexical Cities.

How might we move through cities if we have access to all of the world's cities, spaces, places, and events? If *anywhere* is accessible, can we consider a local that is informed by a global and a global that knows any local? If any point gives us a glimpse of the globe, can we invert the world? Can we grasp the atmospheric qualities of spaces and places? Where should we go if we like temples and gods? Can these indexes tell us a story about an event that happened in Kyoto? And what would it look like in Berlin? And can we find Berlinness in Mumbai then? Can we *re-member* places that we do not know of yet by assuming, like in some sort of anamnesis, our own experience as a learning substrate?

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WORLD-OBJECTS AND ALIENS

Navigating the world in this probabilistic and inclusive manner might seem like a challenge, but the ground for such a task can already be found in our cities and it is part of our everyday lives. Messages travel faster in cities, thanks to the penetration of decentralized connected devices on a granular scale and satellite technology on a global one. The French philosopher Michel Serres (2006) refers to these objects, which have an influence at a planetary scale, as world-objects. He writes, "[b]y world-objects I mean tools with a dimension that is commensurable with one of the dimensions of the world. A satellite for speed, an atomic bomb for energy, the Internet for space, and nuclear waste for time…these are four examples of world-objects." (2006: 5-11) World-objects are part of the world and affect it simultaneously. This self-referential dynamic invokes a situation in which the number of artefacts exceeds the number of users, modifying the roles of the observer and what is being observed, thereby suggesting a new subject-object relation. ○

FIG.1

Can we still call the former objects and the people who use them subjects? Who are the beings that use world-objects? Cities of Indexes are inhabited by multiple natures and different sorts of intelligence, even artificial ones. World-objects allow them to be physically in one space while also having access to the entire world simultaneously. For them, the Internet is a reality-producing machine that blurs the distinction between virtual and actual. They affirm their hybrid condition by stepping back and forth between these two worlds, without needing to accept a fixed ground of belonging. They move through porous spaces, between public and private, distant and close, in different intensities and to different degrees. They present their faces through avatars and brands, as they choose the way they want to talk in public spaces. Digital citizens transform their own world-objects through the use they make of them, inasmuch as these infrastructures modify their understanding of their surroundings.

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They learn to behave in a changing digital public space, as it becomes relative to the articulation of moving centers. ○ FIG.2

INSTRUMENTS OF NAVIGATION

There is nothing such as reality per se, only a continuous process of modeling interpretations of that reality. Models, like instruments of navigation, provide access to the world through approximation, in an attempt to make the infinite both finite and knowable. We can think of particular models as instruments of navigation, such as atlases, perspectives, and search engines, all of which are useful to our navigational task between probability spaces in cities.

With the abundance of available data, we might feel a little lost, adrift in an open sea. Digital technologies allow access to 'anything' in quick and light access (just a few touches on a screen) that, essentially, encourages rapid slips instead of deeper approaches to how to navigate the real and its plenitude of data. The breadth of the horizontal touch on the global surface of things – an extensive horizontal panorama – is orthogonal to the meticulous depth of the local – a vertical elevation. How might we synthesize the global and the local, the object and its observer?

Atlas, the Titan doomed by the gods, supports the celestial vault on its shoulders for eternity. Like a head that circulates, this vault is a model that he sustains through the architectonic play of singular figures that do not remain fixed. It is an idea of the world which itself remains inaccessible, but which it tries to grasp approximatively. Let us imagine the articulation of an atlas, one that builds itself as we navigate through the abstract space of cities. This atlas is a synthesis of views: It neither emphasizes one facet of reality over another, nor does it fix itself with one single perspective. It addresses the tension between the continuity

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of reality, the discreetness of our partial representations, and their "coming together," to try to reconstruct a "vivid model" of the world. An atlas, like any perspective or search engine, depends on an external point of projection.

We can think of models as projections that position us within a space of existence, in the same way that the Renaissance perspective positioned us within the center of the cosmos about 600 years ago. This development, more than simply being about space, concerned how we 'viewed' space 'subjectively'. The physics of bodies was then replaced by a physics of light, which although projective still corresponded to Euclidean geometry. Today, with a new geometry and a new active subject, we are centers amongst many centers in a world in which we cohabit with other sorts of intelligences and with world-objects. It is no longer possible to consider a single eye as the center of the visible world or the vanishing point of infinity. We have left the visual domain of Euclidian geometry towards an invisible mathematical space of communication and relations. How, then, could a perspective of the digital come to be?

In De Architectura, the Roman architect Vitruve (27-23 BC) stipulates three "dispositions," or "appropriate arrangements", for architecture: Ichnographia, Orthographia, and Scenographia, which were later assimilated on to plan, elevation, and projective plane. These dispositions are substrates of the Renaissance's perspective. In the same way, with a new geometry, could they be considered as 'informational substrates' with which one could think of a perspective of the digital?

While the geometry of the Renaissance is about seeing, the geometry of the digital is perhaps about something we cannot see. In 1854, the German mathematician Bernhard Riemann introduced a radically different conception of space. Riemann created the idea of a manifold, based on a notion of measurement that is only accessible self-referentially, by comparing parts and without the need for an external standard. Yet, Riemannian geometry is infini-

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tesimally Euclidean, given that a manifold can be locally described by coordinates. Linear approximations at each point of a manifold involve tangent spaces that contain all of the possible directions in which one can tangentially pass through that point. The pendular movement, between spaces of different dimensionalities, could be understood as a circular process of communication, between the derivation of tangent spaces and the integration of infinitesimal intervals.

The concept of a manifold, while spatial, does not necessarily refer to a physical space. One of Riemann's more profound ideas is that many structures can be considered as spaces in mathematics. We will explore these n-dimensional spaces as we deal with the informational makeup of the city in the following sections. Riemann's geometry works with an infinite-dimensional linear space, where any point reflects the whole world.

When one asks something to a search engine, the whole world is placed in circulation around a specific point. A request is made and all of the world's knowledge circulates around that one particular question, as a list of probable answers, in a fraction of a second. Google first assigned dynamic hierarchies on the web, considering the importance of each website in relation to all of the others and in probabilistic terms, like a huge Markov Chain. Although intention drives searches, the user's intentions here remain encapsulated within given profiles that might reduce the scope of the informational spaces they can access, conflating identity and persona in one.

Rather than creating a search engine within a given frame of what the world might mean, we will instead mimic Google's approach, while maintaining a focus on the role of an active observer in the articulation of personal models of the city. This personal search engine is about articulating ideas of the city within particular worlds. It operates like a navigational instrument, pointing in a probabilistic manner towards unknown spaces, places, and events,

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about which we can talk implicitly about those that we know. With a geometry of the digital, where any point reflects the whole world, we will no longer talk about points in space, but about dimensionalities of any-space and a new level of technology to explore it.

NAVIGATION WITH A PERSONAL SEARCH ENGINE FOR A WORLD

Let us imagine, for the sake of this peculiar navigational task, the articulation of an instrument of navigation like a search engine. Such an instrument allows for navigation through n-dimensional spaces of the city – spaces, places, and events – all while providing a spectrum of the most suitable articulations for a specific observer. Rather than distances, this navigability is led by the conceptual similarity between these n-dimensional spaces. Like with any atlas or search engine, each of their models is a projection from which another projection might unfold, and so on infinitely. We will also explore diverse ways of navigating through the probability space of the city, from model to model.

A context needs to be defined first, though. We will play with millions of spaces and places, orchestrating both the granularity and vastness of World-Objects, specifically via social networks and satellite mapping. This navigational instrument will be articulated within two contexts or transient worlds. First, a generic context, covering 1,000 of the world's cities, as a selection for ichnographic recordings of cities through satellite images. Additionally, a more specific and personal selection, manifesting our interest in 50 particular cities out of these 1,000, will provide a context for orthographic recordings through geotagged Instagram images.

These selections, as their modules are arbitrary, pertain only to a personal interest or a specific question. They define a context that

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can always be redefined and can be considered as space of existence for cities, like actors on stage. ○ FIG.3

PRELUDE: SPACE, PLACE, AND EVENT

This instrument will be articulated around three main substrates: Space, Time, and Life. These substrates can manifest as instances of Spaces, Places and Events. While Space and Place are often addressed in the field of representation at the scales of architecture and the city, through maps and images, the Event pertains to a speculative space, similar to the one concerning projective perspectives. We will relate each of these substrates to a specific dataset:

- **We will link space to a dataset of 400,000 satellite images from a selection of 1,000 cities around the world. These are "modules of space."**
- **We will link place to a dataset of 5,000,000 Instagram-geotagged images from our personal selection of 50 cities. These are "sections of space in time."**
- **An event is articulated an not given by any sort of data. It is an architectonic space in which probable events are selected and collapsed by an active subject.** ○ FIG.4

PRELUDE: SPACE, PLACE, AND EVENT

We will develop three different lexicons of elements, one corresponding to each substrate:

- **For Spaces in Space, a lexicon of Spaceness S.**
- **For Places in Time, a lexicon of Placeness P. For Events in Life, a lexicon of Eventness E.**

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Pendular movements can be performed with these Lexicons:

- A vertical movement of Encoding and Decoding: Between Spaces and Spaceness, Places and Placeness, Events and Eventness.
- And, lastly, a horizontal movement of Translation: Between different lexicons of Spaceness, Placeness, and Eventness, establishing a continuous circulation.

Space and Place are orthogonal to one another. While Space depends on a locational choice, Place depends on the choice of a specific moment that 'cuts' through space in time. As the Chinese geographer Yifu Tuan (1977) describes it as follows: "[w]hat begins as undifferentiated space becomes place as we get to know it better and endow it with value. (...) The ideas "space" and "place" require each other for definition (...) if we think of space as that which allows movement, then place is pause; each pause in movement makes it possible for location to be transformed into place (1977: 28)."

MODULATIONS

Google Maps offers an apparently continuous image of the world. To discretize it, we have chosen an arbitrary module that addresses a particular interest; in this case, a module of 250 meters. Different modules might give better or worse results, depending on one's question, but this is not fixed and remains open to exploration. We now have a lot of 400,000 spaces, out of time. Conversely, we can consider Instagram images as already a unit of a module, cuts of space in time. We have now a lot of 500,000 cuts of space, in time. ○

FIG.5

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ENCODINGS

The different codes used on these images can be inadequate to address the problem of similarity. These representations will be symbolized in a higher level of abstraction. Already modulated, they will now be encoded as vectorial representations, so that any image can 'converse' with others through the use of the same terms and conventions. We encode these images outside of senses and sense, turning each one of them into meaningless n-dimensional vectors that are readable to machines, thereby allowing for a more abstract operational space. The materiality of these images is affirmed and they become something like intensities or recordings of light. ○ FIG.6

LEXICALIZATIONS

An arrangement of concepts can be indexed as a lexicon, where proximity denotes similarity, by transferring them to a space of lower dimensionality. This relationality is not given, but instead emerges out of data itself, "out of the foam." Here, the lexicons of Spaceness and Placeness with 10,240 elementary lexemes each. ○○ FIG.7,8

Lexicons usually cover a particular theme or 'way of talking'. A lexeme inside a lexicon is a base form that can encapsulate all of its possible inflexions. A lexeme can potentially integrate a set of observables that hold a certain similarity together. For instance, in English, run, runs, ran, and running are forms of the same lexeme, which can be represented as run. A lexeme is not a specific location or a thing, but rather the abstract quality of such a thing.

These panoramas remain partial, given that they offer isolated views of the city and lack an active observer. Now that we have these orthogonal substrates at the base of our instrument of navigation, how might we establish communication between Spaceness and Placeness? Spaces can host places, like cuts of space in time that can resonate within a given space.

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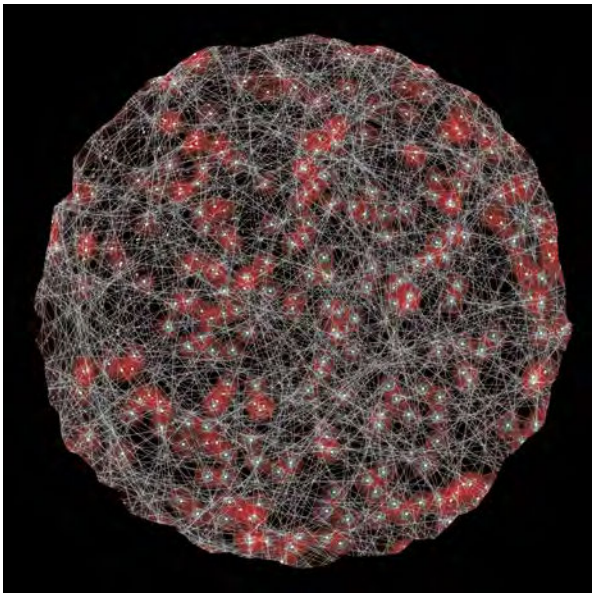

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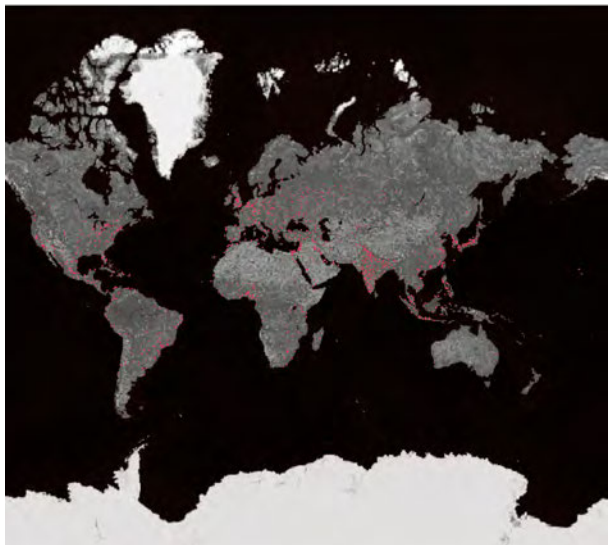
▲ 2



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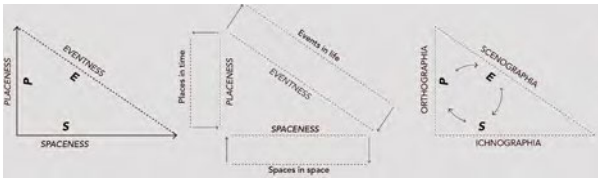

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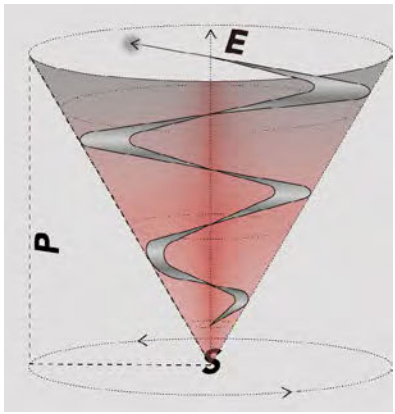

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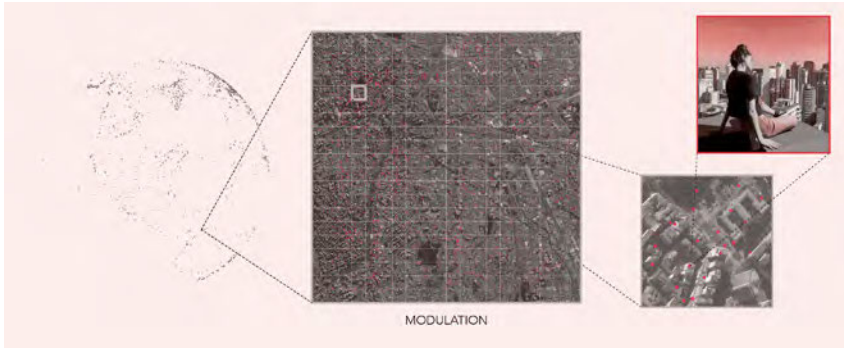

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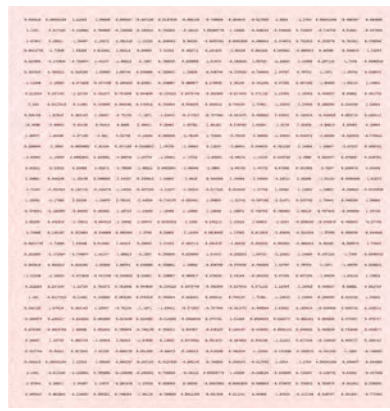

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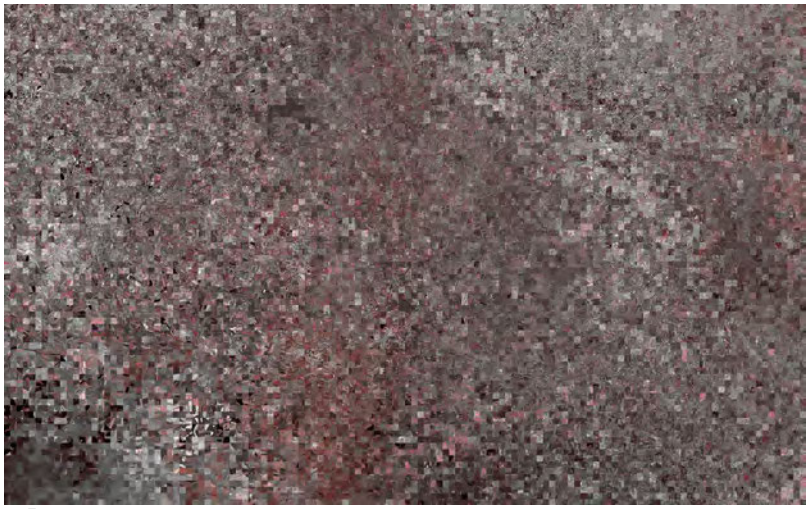

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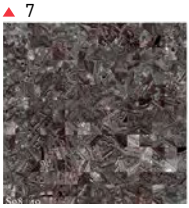

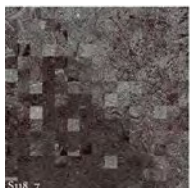

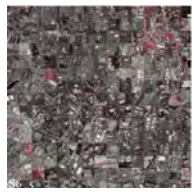

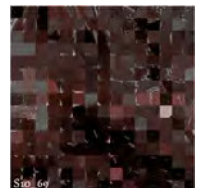

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We refer to this bundle as a concrete locality, given that space can host various places. Any specific space or place can be symbolized by a lexeme. Certain lexemes of Placeness have a higher probability of being found together inside a certain lexeme of Spaceness. A concrete locality addressed in a lexical manner is an 'abstract locality', which can be considered as a complete graph or a graph of all possible paths between all Placenesses within a particular Spaceness. ○○ FIG.9,10

The vectorial encoding of an 'abstract locality' is the centrality degree of its graph or the frequency of each lexeme of Placeness within the particular Spaceness. Out of this matrix, a third lexicon will be indexed, encapsulating Spaceness and Placeness into lexemes of Eventness.

We can think of an Eventness as the quality of the resonance of actions taking place within a city's spaces: Grocery shopping in a market, partying in a nightclub, a stroll in a park. These stories might happen in a multiplicity of times and locations, as an abstract idea to which we can only refer indexically. For instance, when we think of a day at a museum, what comes to mind? Pieces of art, paintings, sculptures, benches. There is no causality in their folding together, but rather a resonance. An Eventness can be collapsed into a multiplicity of possible events, depending on the interest of an active observer.

SCENOGRAPHIC PROJECTIONS

Our three lexicons can be reindexed by considering their frequency within each city, to become tables on which cities can project faces. A city can get as many faces as the lexicons with which it can talk. We can refer to the play of these faces on scene as a "way of talking". ○○ FIG.11,12

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TRANSLATIONS

Cities talk and gather in different and meaningful ways depending on a specific 'way of talking'. Different ways of talking can be translated into one another, in a continuous circulation from Placeness to Spaceness to Eventness and so on. We project ourselves on these tables by selecting and exploring city atmospheres that we are curious about. Our chosen moods insinuate three themes focused on Western, Northern, and Eastern European cities respectively. It might be possible to detect wide nuances between them, even within the proximity of a shared 'Europeanness'. None of these associations are known beforehand. Operability on an abstract lexical level allows these narrations to emerge through implicit relationality.

For instance, we can access a cluster of Northern cities' through representative lexemes of Spaceness. Their ichnographic projections encapsulate the most characteristic atmospheres for these cities: large green areas and forests, coastlines, and a predominant sea. This could be a narration of what Northern cities, spatial qualities or 'Nordicness' could be about. This narrative can be translated again into Placeness by its articulation with Eventness as translator, showing a story of open landscapes, warm clothing, forests, cabins, boats, and sea views.

We can ask for the Placeness of some Western European cities such as Cologne, Paris, Berlin, and Lyon. Eventness allows us to consider the spatial qualities of Spaceness that are likely to resonate with these Placenesses. In Placeness, we can obtain a clear consistency over a theme: historical landmarks, monuments, vast city skylines, night views, inner and outer architectural details. In Spaceness, we find consistency towards a predominant European city fabric comprehending boulevards, star-shaped intersections, generous public spaces, and old towns.

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PROJECTIONS

We could also take a city we like as a projection point, considering its most characteristic lexemes and inflecting these flavors in specific localities. Which are the closest cities to that condition? Can we then jump from event to event, decoupling from space and time? We start a personal journey by choosing an entry point. What is the weather like in Tokyo? Is there something such as Tokyoness? Tokyo's 'ways of talking' with the world is articulated in different manners and lexicons that remain cryptic to me, a human and alien, traveler at home.

Tokyoness in Tokyo

From Eventness E32_5, a particular story unfolds with J-pop in a karaoke bar, 24/7 restaurants, bright, colorful photobooths that are filled with cute, drunk girls, businessman merging with young wild souls, small lanes, architecture sightseeing under nocturnal neon lights, trees with colorful leaves in the fall and flowers in spring, kawai pets, and balloons, vibrant cakes and all sort of soups and noodles. We can translate this resonance into specific spatialities and their locations in space, scattered around the secret Imperial Palace, almost in a circular fashion.

This is an idea of 'Tokyoness' within our transient world, one amongst many possible ones. Every city can be many cities. We might project the quality of 'Tokyoness' onto other locals by asking: "where else is there 'Tokyoness' in the world? What are the cities articulating a similar narrative, but which differ in their own tone?" Not unlike Foucault's heterotopias, these projections from local to local may create enclaves of localized otherness, patches, or pockets that scape, but also connect with, their surroundings and are "capable of juxtaposing in a single real place several spaces, several sites that are in themselves incompatible."[1] ○

FIG.13

01 Foucault, Michel, and Jay Miskowiec (1986): "Of other spaces." diacritics 16/1 (1986): 22-27.

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Tokyoness in Seoul

These projections are digital perspectives, personal yet considering the world at large. 'Tokyoness' will be then our starting point and we project our desire and intention from this abstract chosen point on a panorama. We want more of this weather, more of this flavor, like a myth retold in different tongues. The following projections are orderly deployed based on their similarity to 'Tokyoness'. We navigate through projections of 'Tokyoness', as one collapses a wave into particles by observing it, as collapsed events out of Eventness.

We find 'Tokyoness' in Seoul, with similar concepts, like lexemes deployed in other inflexions, another weather within the same climate. Resonance is invariant, indexes remain, the food, the neon lights, the pets, and the young faces. Yet within this familiarity, something is strange anew. These concepts are instantiated in a localized manner. Food looks the same yet different, more meat, fewer noodles, more barbeque. Present, yet less significant perhaps, it gives more room to nightlife and fashionable youngsters. ○ FIG.14

Tokyoness in Bangkok

We continue navigating through this Eventness, jumping from event to event, appearing and disappearing with this magic trick, outside of time and space. Bangkok follows where small streets are replaced by proud Blade-Runner-esque viaducts and wide highways populated by motorbikes swarming around like red-eyed flies. The local cuisine has its own colors and cuts, green papaya, mango, curries, sour and sweet flavors come to one's tongue. Every night is a summer night swarming with people, sensual young androgyne faces with different features and fashions. Once again, these events can be detected as probable spaces in our transient world. Our instrument indicates the points in space where' otherness' could take place, where 'Tokyoness' of Bangkok thrives like a personal fantasy, our personal heterotopia. ○ FIG.15

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Tokyoness in Vancouver

Last stop for this climate. 'Tokyoness' in Vancouver pierces across the globe like an atlas does with its projections like arrows. Streets turn into covered spaces and bridges, perhaps providing shelter during the long cold winters. Burgers, pizza, and beer appear upon the table in warmly lit interiors, while large groups of people become smaller and give room to dusty morning skies and a glittering sea. People photograph themselves with the city as a background, where gleaming towers of ice rise like sharp heads wrapped in a haze.

The city's bridges and the waterside seem to be the greatest attraction here. They will then serve as the next projection and entry point, from which we go on weaving this navigation thread into the manifold fabric of our transient world. ○

FIG.16

Bridgeness

'Bridgeness', also known as lexeme E32_17, and its neighboring lexemes, is our new point of projection; bridging is what communication processes are all about after all. A new materiality of bridges is created, through its symbol 'bridgeness', thereby transcending particularities and grammars. From here on, we can trace what would be a climatic idea of 'bridgeness' in our transient world – a panorama of lines hovering wide gaps, cutting sharply between sky and water, and yet connecting domains. Straight, curved, undulating, intrepid, 'bridgeness' plays a special kind of music, a resonance of times, sheaves of times, and Eigen-times. At sunset, at dawn, ancient, modern, glowing on shaky reflections. We dive into this 'bridgeness' of the world, orderly, following those local weathers where it glows with intensity.

Bridgeness in Köln

'Bridgeness' in Köln or lexeme E32_17, instantiates the particularities in this town of carnival and monks. Arching over the Rhine three times, like pebbles rippling over still water. Admired from near and afar, at dawn, at dusk,

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at night, shining on the shaky reflections of the river. Thousands of padlocks hang from its railings, each inscribed, painted, or otherwise decorated by thousands of unrelated couples. Not only does the padlock remain as testimony, but also thousands of orthographias or cuts in time. We cannot help but think of the thousands of tiny keys dropped over the edge, tumbling far below into the eternal riverbed of the Rhine. ○ FIG.17

Bridgeness in London

Another perspective unfolds out of 'bridgeness' in London or lexeme E32_18. Another potential relationality where culture becomes a 'could have been' with an English air of London's ancient, yet so modern, flair. London Bridge, Millennium Bridge, the London Eye clear despite gazing through a haze. A brutalist Hayward gallery over the rolling, raging Thames of yore, where ancient Roman armies marched to shore and proclaimed: Londinium. A skyline of cranes lit up at night, and a glowing Shard in the dark sky. Pubs, bars, clubs, and glittering pavements against the sweet darkness of 'bridgeness' in London. ○ FIG.18

Bridgeness in Florence

We will continue through the 'bridgeness' of Florence over the Arno river. A collection appears as cut-out silhouettes against the background of a Renaissant city, one after the other in a concatenation of arches and stones. Why do couples resonate with old bridges? Is it the sunset, the skyline, the river, the stones, the connection? ○ FIG.19

Bridgeness in Auckland

'Bridgeness' in Auckland, modern and intrepid, where we make a pause and divert towards a new projection point. Transposing our navigation vector, instead of hopping from city to city, we choose Auckland as a new projection plane for a multiplicity of climatic conditions. ○ FIG.20

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Watersideness in Auckland

Transposing our navigation vector, instead of hopping from city to city, we choose and anchor a local to be the projection plane for a multiplicity of climatic conditions. A new collection of articulated weathers appear in Auckland that give us an idea of what the city might be about, depending on the way we decide to observe it. Moving not so far away from 'bridgeness' in the spectrum of Eventness, there is 'watersideness' or lexeme E32_20. They share skies and seas, yet each event preserves its own specificities. While 'bridgeness' celebrates the structure itself, 'watersideness' sparkles on spots around the seaside and acknowledges glittering nocturnal city landscapes and horizon lines between sky and sea, only remarkable by the light contrast between shades of blue. ○ FIG.21

Concertness in Auckland

Moving a little further away across the spectrum, E22_01 explodes into a profusion of colors flickering like nervous sounds: red, blue, pink, yellow – electric lights blinking in the darkness of the night. Guitars, rock stars, stages, games, colorful flyers, ordered rows of seats, and crowds. One could almost hear that white noise in the wind, the excitement, and the ovation. Our instrument of navigation points towards, stadiums, theaters, and halls, yet without ever explicitly presenting what these spaces and buildings are about. Not a typology, not an ideotype, just a bundle of indexes expressing possible ways in which spaces and places meet.

Sunsetness in Auckland

E10_01 also known as 'sunsetness' unfolds in nuances spanning between blues, purples, reds, and oranges – a hesitation between 'parkness' and 'watersideness'. The sky opens with clouds in shapes given by a mixture between probability and wind. Some other recognizable figures appear, a sailing ship, a pier, a motorbike, all means to take us there, 'away'.

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BRANDING THE ACTIVE OBSERVER

The 'at homeness' we feel with each and every one of these perspective models is a quality of awareness that is poised between the unconscious feeling of being rooted and the conscious feeling of being alienated. This process of learning is subconscious, like learning how to appreciate sushi or to like someone or to feel at home in a new city. Unsharp borders become a little sharper just by 'being there', even without a specific set of instructions. A child learns how to speak by watching adults doing so. Knowing about the grammars of language before this process would hinder this learning process.

Hence, we took up the endeavor of learning to 'talk' in the digital. Mingling text and cities, we have offered navigation through the sea of urban data as a narrative articulated in lexemes of cityness. These stories defy single interpretations, grammars, and territories, taking us to unknown lands. However, the narrative is never given nor is it ever finished; it is invented anew with every point of projection one hops on, within the operative and performative character of the digital. This is precisely the character that cities, architecture, and the digital all share.

Rather than proposing an external frame of reference to which the city condition must fit generically, models articulated 'in their own terms' have been proposed. First, articulated in terms of self-referentiality in the constitution of elements or lexemes. The lexicalization of localized instances of the city into concepts addresses the problem of similarity. Second, articulated in terms of probability, such sequences of elements are not dictated by grammars or given structures, but rather emerge as a manifestation of personal agencies and the concert of living and inert things, which is culture.

Over the last decade, information technologies have exponentially developed and advanced into nearly every aspect of our lives, collapsing the boundaries of space and time.

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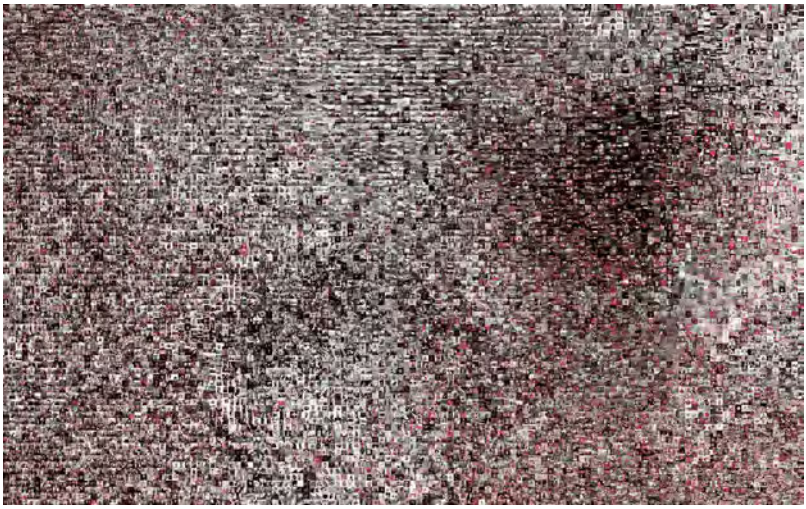

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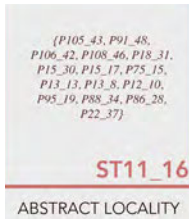

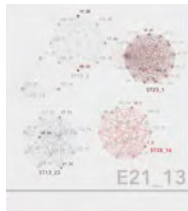

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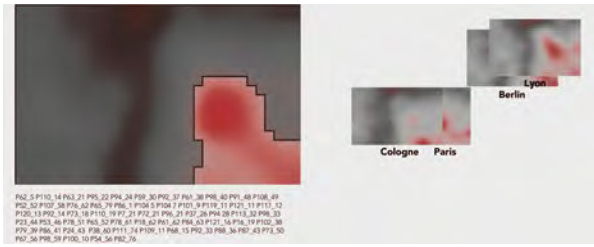

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Beyond intensively and sometimes dramatically mediatized urban demographics, today the city has also taken on the dimensions of its informational makeup, through communication networks as its ground, thereby assimilating now the scale of the Earth like a glacier or an ocean, as Michel Serres prophetically described it in his world-objects. Here or there, hors-là, we are all locally connected to the global and inversely. We look at the stars and yet the stars look at us through fantastic satellites. Everywhere locally natives and globally migrants, otherness has become home. This new home demands a rediscovery of the world anew, like when Copernicus, the Renaissance mathematician and astronomer, presented a model of the universe that placed the sun, rather than the earth, at its center. Could we even imagine what this could have meant to a Renaissance mind? Perhaps nothing made sense any longer, yet they articulated new meanings and reinvented a more capacious world, trusting their intellect rather than their intuition, with a new geometry and a new subject at its center.

As we get a wider outlook, our own cityness starts appearing alongside many others. Everything can communicate with everything as long as the keys are shared, cities, spaces, places, events, and personas. One just needs to learn how to talk and choose a seat. Having domesticated that wild open sea, we can come inside without fear and say 'this is home!', yet always secure in the knowledge that we will be over and over 'aliens at home.'

→VIDEO LINK

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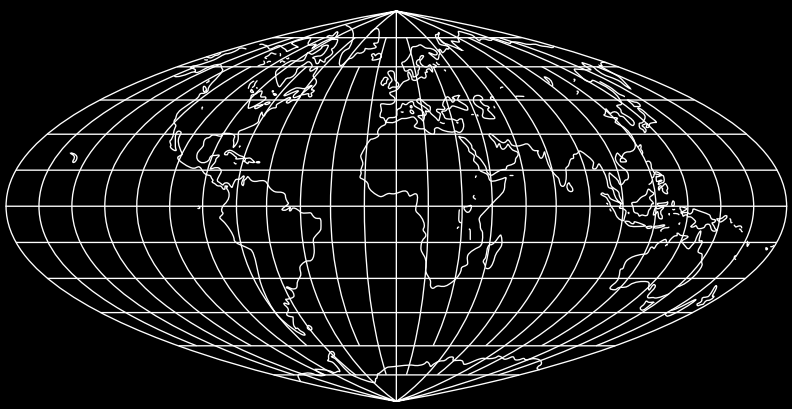
REFLECTIONS ON THE CARTOGRAPHIC LANGUAGES



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When collectively mapping possible worlds

“Expanding both heart and mind, engaged pedagogy makes us better learners because it asks us to embrace and explore the practice of knowing together” (hooks 2010: 22)

kollektiv orangotango is a circle of critical geographers and friends who have been in coevolution since the 2000s. As popular educators, we strive for a collective horizontal production of knowledge; as militant scholars, we link practical interventions and theoretical reflection (Halder 2018). Our commitment to mutual aid and to solidarity ties us to a network of befriended activists and researchers who, in extensive collaborations and through joint learning processes, have become part of kollektiv orangotango. We place our work at the service of emancipatory processes in youth clubs and community gardens, in schools and autonomous social centers, on park benches and in lecture halls, in favelas and in rural communities. Despite our engagements in artistic interventions in public space, urban agriculture, and others, we are unemployed geographers with a predilection for maps. In fact, critical cartography is a crucial part of our work. Throughout the last decade we have

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co-conducted collective mappings and critical cartography processes in Latin America and Europe. Concomitantly, we have published a series of educational and DIY mapping materials, including multilingual manuals[1], video tutorials[2], and an international collection of counter-cartographies (kollektiv orangotango+ 2018). While we sometimes co-create critical maps as results, we are mostly interested in mapping as a process, and that is what is at stake in this chapter. Collective mapping for us is a common process of territorial reflection, awareness-building and self-organization. It is a process in which one's own relationship to space is reflected upon, in which different intersubjective perspectives as well as different types of knowledge (e.g., every day, traditional, embodied, and academic knowledge) can flow together and open up scope for action. To achieve this, we feel that it is crucial to integrate a notion of "sentipensar" – sensing/thinking – (Escobar 2020: 67) into what, with reference to bell hooks may be termed "engaged cartography", that is, a cartography based on dialog that engages in both "heart and mind" (hooks 2010: 22). This happens by casting a spatial perspective on the dialectical relationship between us humans and our environment; this relationship can be changed by humans, which in turn changes humans. Thus, we understand collective mapping as the process of geographic alphabetization in everyday life and action spaces through dialog, "mediated by the world" (Freire 2000: 80). – We continuously learn from co-mappers as we adapt the means and presumptions of our mapping practices to the concrete social contexts in which we coincide.

MAPPING OTHER WORLDS

After years of mapping with diverse groups in various contexts, we are determined to experiment and to develop our practice towards new forms and ways of mapping. We note that most critical maps, including some co-authored by ourselves, reproduce the forms and formalities of traditional western cartography to a significant extent. This concerns adherence to a Cartesian coordinate system, to conventions of scale, projections, as well as to the use of administrative and state borders in

01 Available online at: (kollektiv orangotango n.d.).
02 Available online at: (kollektiv orangotango n.d.).

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map bases and as a means to structure one's own cartographic analysis and representation, to name just the most obvious ones. The few cases in which lessons from critical cartography have made their way to a somewhat wider public are, more often than not, sustained by strong alternative images or icons, as has most illustratively been shown in Joaquín Torres García's famous drawing "América Invertida". Yet, the set of "other" cartographic knowledge or imagery remains rather limited. For instance, the Mapuches' privileging of the east – where the sun rises – as the main cardinal point (Mansilla Quiñones/Pehuén/Letelier 2019) lacks prominence even in critical-cartography discourses.

Our engagement as popular educators who promote critical cartography, our experience in collective mapping, as well as discussions with fellow critical cartographers from diverse backgrounds, urge us to go beyond standard attributes of critical cartography. This implies the necessity to develop cartographic means that not only criticize some elements of traditional cartography, but also those that open our gaze towards new cartographies based on different conceptions of space, territory, and the relations that they contain. For cartography to do its humble part in "constructing the pluriverse" (Reiter 2018), it first needs to embrace "multiple forms of knowledge, including the affective, embodied, oral, cognitive and cultural" (Motta 2015: 178) and find adequate means to give voice to this plurality of knowledges. It involves using maps and mapping processes as one among many tools to develop a different imagination of the world and our relations with and within it. As Ângela Massumi Katuta puts it in a recent talk on mapping as a tool for emancipation, in order to satisfy the demand to represent other forms of being[3] in the world, we need to carry out a rupture in cartographic visual language

03 In Portuguese, Katuta speaks of both "ser e estar no mundo".

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(AGB Porto Alegre 2020)[4]. Indeed, Katuta argues that we need to broaden the concept of what a "map" is in order to include "other" epistemologies or cosmovisions and, therefore, make cartography a tool for the creation of new worlds. Careful inquiry into non-Western, indigenous, or non-modern mapping practices supply rich insights regarding other cartographic languages. While research on specific indigenous mapping practices has gained some attention in recent decades, an intensified participation of indigenous subjects and knowledges into mapping processes would be vital to decolonize cartography (Rose-Redwood et al. 2020: 151) and to integrate an enhanced choice of mapping tools and graphic elements to countermappers' repertoires.[5]

04 It is not by coincidence that we cite a range of current multimedia publications, instead of limiting ourselves to references to prestigious scientific journals and books. This is because, on the one hand, this text is the fruit of a very special historic context, the 2020 Corona pandemic, in which online discussions in particular, both live or archived on popular video platforms, gain a renewed relevance, and offer a great deal of relevant data, way before being published in written formats. On the other hand, we are rather fed up with proprietary knowledge production. In the 21st century, the validity of Proudhoun's famous phrase needs to be emphasized more than ever, and this time with special vehemence for the property of knowledge. Proprietary knowledge is thieved knowledge! Thus, we prioritize references to all kinds of open access formats. Moreover, we prioritize multimedia formats to continuous text, as we hope these formats invite people into the discussion who are traditionally excluded from academic debates, but whose contribution is all the more valuable and essential for "constructing the pluriverse" (Reiter 2018).

05 The decolonization of cartography comes with challenges. Painstaking attentiveness towards the danger of coopting indigenous mapping practices is essential here. After all, instead of serving the strengthening of the sovereignty of indigenous communities in their territories, these maps might serve the particular interest of the state and/or capital (Bryan/Wood 2015) or the mistreatment of indigenous cosmovisions by forcing their spatial perception into the Cartesian coordinate system to be considered valid knowledge in court cases on the issue of indigenous land rights.

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We take this occasion to reflect on some of the means of designing maps and elaborate on how we hope to develop them further towards decolonial mapping practices. This is no blueprint. We share our experience in order to open up dialog, to learn from each other, delearn toxic residues of colonial and corporate cartography and, instead, create maps in which – to borrow the famous Zapatista slogan – many worlds fit.

We start this by scrutinizing two of the most basic graphic elements that most maps contain: surfaces and lines. Let us, to this end, follow the dominant modern images of maps as plain paper maps. Before the mapping starts, there is the unmapped void, epitomized by blank white space. Instead, we started to use different colored blank sheets as cartographic bases, given that we realized that this implies other imaginaries of the map's void. Instead of depicting the simplified, exclusively relevant data on an "emptiness" – white – background, we meditated and discussed with co-mappers about how they felt about those aspects that are not going to be visualized in this specific map and decided on which color best depicts this pluriversal "fullness, beauty and vitality" (Escobar 2020: 133). The change in perspective that we hope to accomplish suggests that mapping is not about knowing everything about the mapped territory and topic, and thus having to erase the white spots on the map (Glissant 2013: 51). Instead, we realized that in a lot of cases, collective cartography implies a smashing together of heterogeneous, often divergent experiences in shared territories. This exhorted us to question our cartographer's reflex to seek an unequivocally valid representation. We propose applying opacity (see Glissant 1997, 190) as a decolonial option to visualize complexity in order to visualize the appreciation for difference and caring coexistence. This also implies map-makers' and map-users' right to get lost in the map, to misunderstand, and to derive other meanings therefrom. In this sense, the map is no longer the state's or the landlord's tool for "legibility

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and simplification" (Scott 1998: 9), but instead offers traces that become relevant for readers, not by indicating an unequivocal way to follow, but by leaving hints to complex realities and possible ways, possible spaces, and possible actions. In workshops, we propose coloring areas with pastel crayons, thereby permitting the overlaying and mixing of different shades, in order to demonstrate the overlapping coexistence of many worlds.

Pastel crayons are also a preferable coloring tool for our purposes because they are especially apt for blurring a colored surface's borders. Apart from the use of distorted, biased projections and north-up cartographic bases, the unreflected reproduction of national and administrative borders in cartographic bases is one of the most frequent blunders committed even in the realm of "critical mapping". This "territorial trap", as John Agnew framed it in 1994, is certainly most evident and politically efficacious in the case of national states, dominantly conceived in political science and public discourse as container spaces (Agnew 1994). Substantial accomplishments have been made by the struggles of popular groups or indigenous communities for their right to define their own territories, regardless of state or property borders. Yet, we argue that taking the danger of the territorial trap seriously means questioning the sharp dividing line as a cartographic visual element as a whole. It bears a colonial logic of simplifying division and segregation. It is, in short, the logic of the state's mapping, so accurately described by Scott in his seminal work "Seeing like a State" (Scott 1998). However valuable the demarcation of certain territories may be for emancipatory struggles (see Zibechi 2011; Bartholl 2018), we suggest that the sharp line be avoided whenever possible when visually representing these territories, in order to do justice to the rhizomic – multiple, dynamic, heterogeneous – interconnectedness of territories (see Oslender 2019: 12). Thus, the blurred, overlapping borders between crayon-colored territo-

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ries of our maps might represent what Escobar (2018: 83) referred to as "zones of contact and partial common ground". This converges with what we can learn from Mapuche territorial ontology for which the idea of boundaries or borders does not exist. The Mapuche concept of Xawümen is used to identify the points and lines of territorial demarcation between Lofs, which correspond to the smallest units that divide Mapuche territory. Xawümen builds on the idea of coming together, unifying, and linking parts (Mansilla Quiñones/Pehuen 2019: 42). Understanding Xawümen, as a territorial concept of coming together and unifying, opens up a new perspective on co-existing and eventually offers possibilities for building a positive otherness, allowing people to put themselves in one another's shoes, to promote respectful dialog, and to create a meeting of worlds. Engaged-cartography, given its commitment to the creation of relations between diverse (territorial) experiences, identities, and imaginations, needs to engage in the development of new graphic expressions to represent border zones of encounter. In this sense, as opposed to the dividing, enclosing line, we strongly encourage the extensive use of lines – multiple, colorful, straight, wavy, crooked, interconnected, and interwoven – as representations of connections, relations, and dynamics. Get yourself inspired by Tim Ingold's (2008) anthropological archaeology of the line.

Yet, transcending the notion of paper as the taken for granted raw material for mapping, the demand to find adequate expressions to embrace multiple forms of knowledge into mapping processes also led us to reflect on the materiality of the maps we produce collectively and, consequently, of the sensual perceptions and the stimulus that they imply. How might we get past the dominant role played by the visual and engage other sensations that might be more apt for transmitting certain forms of knowledge into mapping? We derive some possible answers to this question from the material practicalities that arose in our practice when

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mapping in bustling places, in public space, or with large youth groups. Instead of using fragile paper as a raw material for mapping, we started to work with more durable materials like cardboard or textiles. This led us to reflect on how the material character of a map, by addressing other than visual senses and connotations, may be better adapted to transmit certain layers of meaning that conventional paper maps hardly address. So, one of the first questions to pose, when collectively discussing how to map a topic of common interest, might be: "What does this topic make us feel like? If this feeling had a material body, what would it be made of – wood, concrete, paper, woven fabric…?" Integrating a range of materials in the creation of maps – and the mapping process (see Olmedo 2018) – expands the range of sensory perceptions it addresses, and thus permits a dialog with other aspects of spatial experience. ○ FIG.1

John Krygier emphasized the potential of integrating audio into digital cartography as early as 1994, and many others have elaborated on digital audiovisual maps ever since (Krygier 1994; see Edler et al. 2019). Why not integrate sound in analog collective mapping? In terms of the audiovisual, are we capable of producing simply-audio maps? Indeed, we work with soundmaps that allow groups to explore and to enjoy soundscapes, eventually without the visual, in order to further extend the variety of sensory perceptions in our cartographic repertoire. Since smartphones work as both recording and playback devices, a soundmap can be constructed without much additional equipment. Collective mappers may record sounds, produced with their bodies or encountered in on-site visits, or find suitable audio in internet sound archives or even on popular music platforms, depending on the maps' topic and purpose. Having the relevant sounds on the devices means that these can be distributed on the map's basis – e.g., the floor of the room in which the mapping takes place. The coordi-

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nates may be geographically referenced, but can also relate to thematic or emotional fields. Now co-mappers can discover the map by wandering on it. If the group is in a safe place, this can be done with closed eyes.

Mapping with children and youngsters in particular led us to experiment with other techniques and to create new cartographic expressions. Breaking up notions of metric scale and maps as static objects, we work with busy picture maps in which participants can move elements around to create diverse encounters and constellations. As a result, the map becomes a territory for collective ludic engagement and debate. We combine mapping with performative elements by building on Augusto Boal's 'Theatre of the Oppressed' (see Boal 1982). In a combination of ludic maps with theatre methods, we collectively build maps in a walk-through scale, so that mappers and passersby – turning themselves into spontaneous mappers – can move themselves on the map and move the map: Meet, argue, hug on the map. ○ Other, very valuable works to integrate our own bodies in our maps, and moreover to integrate the "body-territory" into territorial struggles, have been formulated by Latin American feminist cartographers in recent years. The mapping practices have been described illustratively in the manual "Mapeando el Cuerpo-Territorio" (Colectivo Miradas Críticas del Territorio desde el Feminismo 2017) or in the booklet "Los Feminismos como Práctica Espacial" (Colectivo Geografía Crítica 2018) and build on the assumption that our own body-territories are, indeed, the first territory to be reappropriated through consciousness-raising body mapping. In a nutshell, the message of these feminist mapping practices can be found on the top of the social media page of Mexican critical geography collective Geobrujas – Comunidad de Geógrafas: "Neither land nor women are territory of conquest".

FIG.2

From our body-territories to everyday environments, mapping is a precious tool for reim-

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agining ourselves and our diverse ways of being in the world. Yet, it is the world – the global – that, as an object of mapping, gains special attention if mapping ought to be one of many tools to express an emergent decolonial global ethics (Dunford 2017). Critical cartography, if committed to providing tools to a decolonial pedagogy and politics, must not abandon the scale of the planetary (De Lissovoy 2010: 290). Which graphic elements and aesthetic strategies can cartography provide when it comes to visualizing a world in which many worlds – and many ways of being in the world – fit? How can we create cartographic representations of worlds that emphasize conviviality, rather than distance; encounter, rather than separation; and complexity, rather than unequivocality? The first part of the answer comes easily: Never again shall any cartography – no matter what its epistemological or ideological basis be – dictate a "single notion of the world" (Escobar 2018: 84). Can we, at least, offer a map basis on which pluriversal existing and becoming subjects might experiment themselves? When discussing this, in the course of the Not-an-Atlas project (see below), we concurred that such a cartographic basis should express "global solidarity based on non-dominative principles of coexistence and kindredness" (De Lissovoy 2010: 279). We concluded that the aspiration of non-domination should be manifest through the elimination of up-down notions. ○ Whereas the notions of solidarity and kinship may be represented by "closing the ranks", moving the map's elements – continents in the world map's case – together in a way that suggests equal proximity between all elements, without a meaningful order. Finally, we problematized traditional world maps' inherent top-down, bird's eye perspective implying an "abstracted, mental, and totalizing" approach (Morris and Voyce 2015; see Certeau 2002: 119) – "a view of the world as seen by those who rule it – a world from above" as Escobar puts it (Escobar 2018: 82).

FIG.3

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● FIG.1 ▶ Élise Olmedo's collective textile mappings with Moroccan women are a great example of how embracing other materialities and sensory perception can open cartography up to other facets of geographical knowledge.

● FIG.2 ▶ The "map is not the territory" [Korzybski 2005], but the territory may well be transformed into a map, engaging passersby into encounters and collective reflection on possible worlds.

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● FIG.3 ▶ When designing the Not-an-Atlas Logo, we aimed to abandon hierarchical representations of the globe in favor of a holistic representation that emphasizes kindredness. The back-to-front version strives to dismiss the from-above view on the world, prioritizing cartographers' condition of being in the world.

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To better express our commitment to the bottom-up perspective, and our intention of providing a cartographic basis on which to visualize pluriversal ways of being *in* the world, why not depict the continent's silhouettes on the world map as seen from with-*in* the world – that is, back-to-front, when referring to conventional world maps' representations?

FROM COLLECTIVE MAPPINGS TO GLOBAL ENCOUNTERS

As a matter of fact, in addition to our engagement in collective critical mapping in various local contexts, we engaged in counter-cartography on a global scale as we initiated the Not-an-Atlas project in 2015. Building on our activist experiences, and networks as well as friendships with critical cartographers in Latin America and Europe, we invited mappers to participate in the project that was initially directed to publishing the book "This Is Not an Atlas - A Global Collection of Counter-Cartographies" (kollektiv orangotango+ 2018), but that soon turned out to go well beyond the scope of the book.

Not-an-Atlas is itself an attempt to represent the many worlds of critical cartographers from all over. The collection shows how maps are created and transformed as a part of political struggle, for critical research or in art and education: from indigenous territories in the Amazon to the anti-eviction movement in San Francisco; from defending commons in Mexico to mapping refugee camps with balloons in Lebanon; from slums in Nairobi to squats in Berlin; from supporting communities in the Philippines to reporting sexual harassment in Cairo. Not-an-Atlas seeks to inspire, to contribute to emancipatory transformations on the ground by supporting counter-cartographies within and beyond its pages. Finally – and perhaps most importantly – we see this

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book as a guide pointing at many possible worlds, and as an invitation to create more of them: on paper, online, and in the diverse territories in which these mappings are being engaged.

When we reflect on what *This Is Not an Atlas* has become since its publication, the images and emotions that come to our mind are predominantly related to encounters: the diverse co-organizers and participants of mapping events and processes in both Europe and Latin America; ○ severe but always appreciative debates; new contacts, many of which made us feel related to a network of like-minded soulmates with whom we share a common passion and practice (see Halder/Michel/Schweizer 2020). This makes us think and feel that Not-an-Atlas is, indeed, a way of relating and creating a common project in and through difference: a pluriversal cartography. FIG.4

Today, Not-an-Atlas is no longer a "global collection" but a meshwork of global counter-cartographies; the "global" here ought to be understood not as a single cartographic reason being globalized and universally applied, but as a condition that different actors with diverse cartographic reasons and practices share, that relates them across difference, as theorized in Edouard's understanding of globality (Glissant 1997: 94). By sharing experiences and materials, we engage in a collective learning process based on the ongoing dialogue of diverse cartographies, for the creation of cartographic "knowledge as relationality" (Vazquez 2017: 247). Glissant's metaphor of the woven fabric is particularly appropriate in visualizing these relations' convergence, given that fabric's materiality implies a warming, caring quality. Indeed, continuously sharing and co-creating among befriended activist cartographers involves more than just intellectual exchange. It is also an opportunity to practice care, solidarity, and accounta-

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bility.[6] This became clearer to us in the context of the global crisis that affected all of us in 2020.

ONLINE MAPPING AND PANDEMIC SOLIDARITY

What we had enjoyed most about the Not-an-Atlas network, in what was a little over a year since its publication, was meeting fellow mappers in person, getting to know the realities and territories that their respective practices evolved from on the ground. In early 2020, at the onset of the COVID-19 pandemic, the network gained a renewed purpose as a platform of remote collaboration and mutual aid. Quarantined in Germany and Brazil, we wondered how to use mapping as a tool to mobilize communities and to organize solidarity in the face of sanitary, economic, and political crises. In fact, fellow cartographers from the Not-an-Atlas network, equally quarantined in their respective localities, soon approached us with very concrete requests. As a result, during the year of 2020 we engaged in a range of collaborative processes jointly with activists and militant cartographers from various local contexts, all of which deployed collective online mapping to organize mutual aid and communitary resistance in the context of the pandemic.

The resulting maps depict injustices and visualize resistance – as in the case of the global COVID-19 Global Housing Protection Legislation and Housing Justice Action Map, realized by the Anti-Eviction Mapping Project (AEMP) in collaboration with housing justice activists, cartographers, and tech activists.[7] ○ Alternatively, they organized solidarity action and facilitated access to mutual aid networks – as in

FIG.5

06 For a captivating call to practice accountability see Mingus (2019); for a reflection on how the Anti-Eviction Mapping Project's bases its activist mapping practice on the principles of mutual aid, accountability, and embeddedness, see Graziani (2020).

07 (Anti-Eviction Mapping Project n.d.).

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the case of the map Solidariedade e Assistência Social (COVID-19) – RS realized by activist geographers at UFRGS university in southern Brazil.[8] The Not-an-Atlas network operated as a platform for exchanging experiences, knowledge, skills, and resources on direct action mapping, supporting militant struggles on the ground. Conversely, this effort showed us how much work still needs to be done in the realm of digital mapping in order to create non-corporate, secure, free and open-source digital infrastructures, apt for meeting the needs of activists and organizers.[9]

Rather surprisingly to us, these remote collaborations felt not so different to analog collective mapping processes. Just like in face-to-face collaborations, the common ground on which these processes were built was a highly appreciative atmosphere. Regular, often extensive meetings became spaces not only of production of a tactical tool for shared struggles, but also for sharing individual experiences – as well as for fear, anger, and hope. They turned out to be particularly empowering, as they provided a space for the creation of a common narrative of the moment of crisis and resistance we were, and are still, witnessing. In short, these collective efforts are moments of collaborative struggle, but also moments of care and joy, albeit remotely. This corresponds to the observation that Rebecca Solnit recently made with regard to solidarity initiatives emerging as a response to the pandemic all over the world, when stating that engagement in solidarity makes subjects feel more fully human (Solnit 2020: xiv). Just like Solnit, this experience makes us remember Arundhati Roy's famous

08 (kollektiv orangotango 2020a).

09 The Reclus application ("Reclus: Your Counter-Mapping Friend" 2020), written by Luis Felipe Murillo, is an effort that we undertook in order to make the map "Luta pela Moradia Durante a Pandemia" (kollektiv orangotango 2020b) function without corporate tech, and to make the crowd sourcing accessible via the Tor network. Considerable work of this type will be necessary in future years to make collective online mapping free and safe.

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● FIG.4 ▶ Since the book's publication in 2018, we have strived to create encounters of militant cartographers, to exchange tools and knowledges, to create new collaborations and friendships.

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● FIG.5 ▶ Mapping global housing justice struggles in the light of the COVID pandemic.

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phrase in which she affirms: "Another world is not only possible, she is on her way." It is in these collective moments of caring, joyful militant mapping that we "can hear her breathing." (Roy 2006: 86).

ENGAGED ONLINE CARTOGRAPHY?

Do the online maps that accrue from these moments achieve the affinity and hope implied in these unexpected encounters? They are tactical tools for the struggles that they were created to foster. As useful as they may be in function and content, their form and aesthetics are rather conventional – residues of an old world's cartography. From this point of view, the breathing of new worlds is hardly discernible in these maps, even though we could clearly hear it in the collective mapping process from which they were created. How come the invigorating breeze of transformation did not devolve from the process to the visualization?

While we have "other" cartographic formats and aesthetics at hand for analog mapping, as we have elucidated above, unfortunately this does not yet apply to online mapping. As Morris and Voyce state:

> "GIS, GPS, and remote satellite imaging seem to have intensified the divide between top-down and bottom-up mapping, between rational, objective, and scientific representations of fixed space, on the one hand, and experiential, phenomenological, and humanistic representations of lived space, on the other" (Morris/Voyce 2015).

In addition to the aforementioned examples of creating purposeful critical online maps, as activists and popular educators we are increasingly pushed to develop online formats for process-oriented collective mapping activities.

In recent months, rather unwittingly, we have

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developed formats for collective mapping that timidly try to integrate our ambitions to enrich the toolbox of collectively designing maps into online formats, even though we are largely unfamiliar with advanced digital mapping tools. What were especially heartening in this regard were the cartographic processes that we organized in collaboration with befriended activists, artists, and cartographers – the Mexican feminist geographers Geobrujas[10], the São Paulo-based artist-activist Grupo Contrafilé[11], as well as the artist and militant researcher Cristina Ribas[12] – and from which arose a regular online meeting of exchange and cartographic self-education.

As for analog mapping, we realized that the strict adherence to Cartesian space was not helpful for many of the mapping set-ups with which we work. Consequently, instead of working with georeferenciating mapping tools, such as OSM, we started to work with online whiteboard tools. Here, exported map tiles may serve as map basis, just as single-colored backgrounds or image files. ○ A combination of FIG.6 **freehand drawing and collage elements offer great possibilities when it comes to designing collective mappings on paper. The easy access to online imagery and the simple handling of vector graphics allow for new experiences, not to mention the possibilities of embedding audio and video content into maps. Yet, in spite of these advantages, the design possibilities of tools that can be used in groups without coding expertise are limited. This is the case especially for the few free and open-source solutions that, in this field, lag far behind their corporate-tech equivalents.**

10 (“GeoBrujas - Comunidad de Geógrafas” n.d.), see also their contribution to the ESTEPA mapping guide (Hernández-Cantarell et al. 2019).

11 (“Grupo Contrafilé” n.d.).

12 (“Cristina Ribas” n.d.), we strongly recommend reading Cristina’s reflection on complexity and cartography (Ribas 2014).

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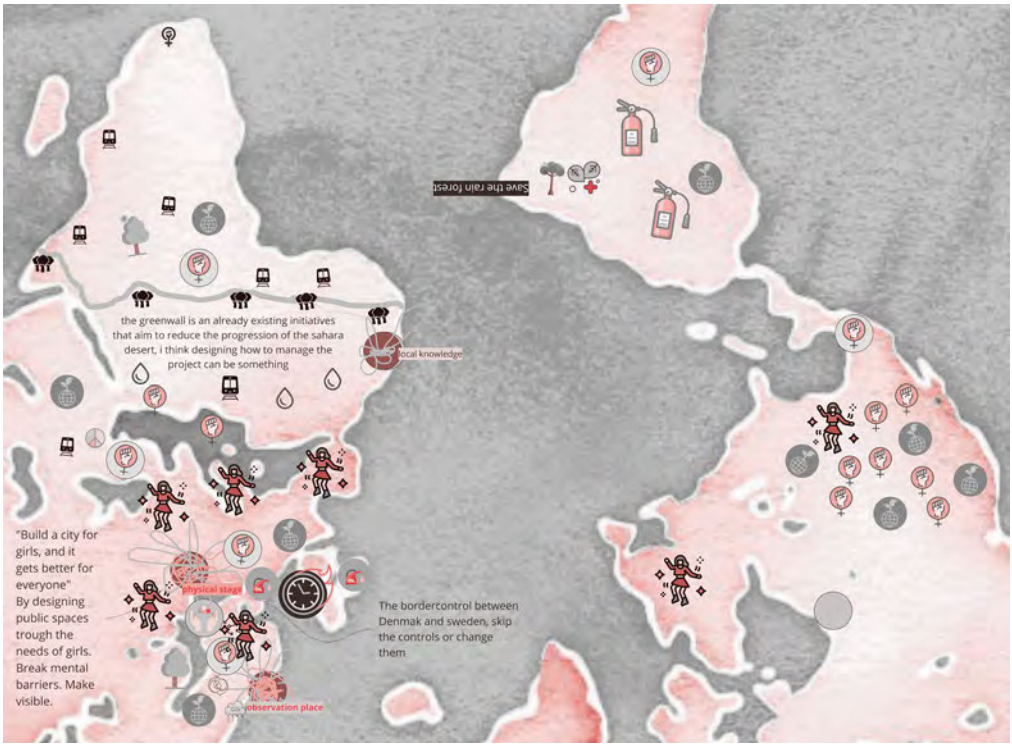

● FIG.6 ▶ Collective online mapping offers, indeed, a wide range of design possibilities. As in mapping on paper, icons, text, and freehand drawing can be combined to discuss, in this example, where co-mappers want to promote social, political, and environmental change [edited by kollektiv orangotango].

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● FIG.7 ▶ Combining digital and analog, collective and individual formats may facilitate the integration of multiple knowledges into online collective mapping, as experienced when sharing these body mappings in a workshop held online.

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As discussed with respect to analog mapping, we try to integrate performative elements into online maps, both by using the whiteboard map as a playing field on which participants can move elements simultaneously, thereby creating a ludic dynamic that is favorable to unexpected outcomes and through the combination of mapping and video-conference tools that offer limited, but nonetheless valuable, possibilities of performative expression. While it is difficult to create safe spaces within these online maps, in our experience, it is wise to combine collective online with individual offline moments, and to encourage co-mappers to share subjective and personal experiences on the map, whilst offering sufficient freedom to not do so. For instance, we facilitated body mapping exercises that co-mappers would do for themselves on paper while listening to our facilitating voice. ○ Afterwards, they shared their individual maps on the whiteboard, where connections, common experiences, and possible support strategies were collectively mapped.

FIG.7

These experiences make us feel that online mapping processes can serve as tools for engaged cartography, integrating mind, heart, and multiple senses, for building affinity groups, and for representing solidarity on the map. Thus, it will be our continued objective to combine insights from analog and digital mapping processes in order to invent new cartographic languages that are apt for collectively mapping possible worlds.

Having said this, we conclude by remarking that mapping is never an end in itself, just a means to this end. As the Iconoclasistas emphasize, its full potential unfolds only as a strategic part of a larger movement, namely when knowledge is exchanged, networks are created, or when resistance becomes visible (iconoclasistas 2013). If the “map is not the territory” (Korzybski 2005, 750), then the mapping itself cannot be the transformation.

→VIDEO LINK

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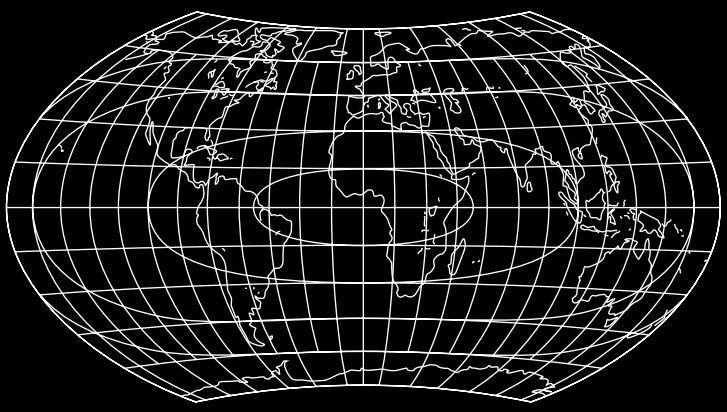
CRITICAL MAP VISUALIZATIONS



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In our chapter, we will discuss a selection of critical visualizations that tackle such diverse topics as the homogeneity of a territory, the representation of minorities, or the juxtaposition of different historical reference frames. These visualizations are closely related to the concept of critical cartography. Critical cartography moves the political and social power of maps to the fore in discussions about cartography. It looks at maps from a poststructuralist and constructivist perspective and defines maps as instruments that proclaim a certain conception of the world (Wood/Fels 2008). Although there has been a recent theoretical shift in mapmaking, most visual practices still come from objectivist cartography. Objectivistic cartography, conversely, believes in a general explanation and a universal order. It seeks design guidelines that should enable cartographers to represent a topic on the earth's surface as faithfully as possible. While objectivist cartography produces

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a very formal design approach, as designers and design theorists we wonder how the critical approach is visualized and how objectivity can be questioned by it. Critical cartography has been discussed previously from a theoretical perspective (Harley 1988, 1989; Wood/Fels 1986; Wood 1992a, 1992b); to that end, we would like to draw the reader's attention towards different forms of critical visualizations.

At the center of our investigation is the question of whether the design authors of map visualizations appear critically, and if so, in what way they do so. Interestingly, a number of discrepancies emerge between theoretical aspects of critical cartography and current critical map visualizations. In the maps, the criticism refers primarily to social problems and is not directed at the visual level, that is, at conventions and paradigms within the design discipline. These includes the homogeneity of the surface (Bertin 1974: 52), the continuous grid, and the assumed stability and unambiguity of signs. In contrast, we start from the hypothesis that critique, on a content level, undermines itself when it relies on conventional map design making.

To illustrate our argument, we will discuss two projects on redlining maps by the Digital Scholarship Lab at the University of Richmond and by data artist Josh Begley. These works show that critical reflection on the paradigms of representation arise not only from the subject matter dealt with, but also from the specific visual logic of comparative representation.

INTRODUCTION

Critical cartography originated during the 1980s and 1990s (Harley 1988, 1989; Wood/Fels 1986; Wood 1992a, 1992b). Based on its theory, corresponding critical map visualizations emerged under such names as Counter-, Radical-, Experimental-, Speculative-, and Deep Mapping. They emphasized the fact that maps can serve other interests than hegemonic ones in very different ways. This activity became a medium of resistance, critique, and emancipation by mapping what is left off of, or out of, official maps.

The context of critical map visualization is still relevant today. Small Multiples, a leading data visualization studio from Australia, focuses on cultural diversity in their work.

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In *Casino Bus Map*[1], the studio focuses on problems faced by migrant communities. The studio shows how casinos are targeting migrant communities, where gambling is increasingly problematic, by combining cultural demographics with the routes taken by casino buses.

Thematically similar, in the sense that the situation of a minority is made visible, are collaborative data visualizations by the group Critical Cartography. The project *Communal Lands of Mexico City*[2] uses experimental ways of collecting and layering spatial data. It is a reaction to Mexico City's problem of affordable housing and aims to discover new settlement opportunities. The group conceives of maps as a medium of knowledge and organizes workshops to produce them collaboratively.

Other important platforms for subjective and collaborative cartography include *Waend*[3], the *Civic Data Design Lab*[4], the *Spatial Agency Platform*[5] which focus on the relationship between architecture, space, and politics, the Hong Kong-based *Map Office*[6], as well as *bureau d'études*[7] which published a work entitled: Atlas of agendas – mapping the power, mapping the commons.

Critical maps address social and political issues, albeit with a few exceptions. They visualize what is omitted from official maps. In doing so, the critique mostly focuses on the content of level and is seldom transformed onto the visual layer. Having a background in graphic

01 Small Multiples. "Casino Bus Stops". Accessed January 6, 2021. https://smallmultiples.com.au/projects/casino-bus-maps---the-cash-cow-suburbs/.
02 Critical Cartography. "Communal Lands of Mexico City". Accessed January 6, 2021. https://criticalcartography.com/Communal-Lands-of-Mexico-City.
03 Waend. "A platform for subjective and collaborative spatial publication". Accessed January 6, 2021. http://waend.com.
04 Civic Design Data Lab. Accessed January 6, 2021. http://civicdatadesignlab.mit.edu/.
05 Spatial Agency. Accessed January 6, 2021. https://www.spatialagency.net/.
06 Map Office. Accessed January 6, 2021. http://www.map-office.com/.
07 Bureau d'études. Accessed January 6, 2021. https://bureaudetudes.org/.

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design, we believe that this undermines the critical stance that the authors express in their mappings. Analyzed from a design point of view, many content-critical maps use a visual language that is highly similar to that promoted by representatives of objectivistic cartography. However, the concept of objectivist cartography contrasts with the critical concept. Wood and Krygier argue that the "Map artists do not reject maps. They reject the authority claimed by normative maps to portray reality as it is, that is, with dispassion and objectivity" (2009: 344).

For us, this results in a tension that is also *visually relevant* to the practice of map-making. If the drawing and representation conventions of objectivist cartography are simply and uncritically adopted for critical representations, then they can come into conflict with the critical attitude that questions this same objectivist claim.

CRITICAL CARTOGRAPHY

Critical cartographers question the paradigm of maps as objective, accurate representations of the world. They see maps as political because they are "products of privileged knowledge" that simultaneously produces and stabilizes power structures (Bittner/Michel 2013 with reference to Harley 1988: 278). But why do we read maps as objective representations of the world in the first place? The fact that maps are regarded as truthful is related to their specific pictorial logic, which is determined by immediacy and in presenting an overview. The accuracy afforded to maps is derived from, on the one hand, the scaling of the map, and on the other, from the coordinate system which precisely defines each position on the map.

Different signs on a map come from sign systems that are different and which were originally independent from each other. But through the spatial arrangement, these signs

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are connected to each other through *allocations*. *Allocations* describes how these signs are assigned to positions: "An allocation is an arrangement in unity with two separate systems of structures: a system of spatial relationships between positions and a system of symbolic relationships between signs." (Cancik-Kirschbaum/Mahr 2017: 97).

The constructivist paradigm of maps is based on the fact that isolated sign systems are forced into meaningful connections. It is important to notice that such semantic allocations are *created* in maps. Maps thus produce relationships between signs but also between signs and territories. They force definite relations out of loose information and present them as objective.

A map's simplicity is its strength, or as Michel formulates it, its "highly complexity-reducing coupling of territory and social categories" (Michel 2010: 10). They are powerful because they "fix, unify and delimit spatial, social and temporal categories" (ibid: 10). Visual abstraction takes on a new social and political dimension against this background: They are statements that are only partially factual and that may also be misleading.

Critical cartography tries to deconstruct the illusive truthfulness of maps from a theoretical perspective. Denis Wood (1992b) argues that maps always serve certain interests, and that they become political by doing so. However, we would like to emphasize that this political purpose exists whether the power is claimed for hegemonic or critical-emancipatory interests or not.

To better understand these interests, maps must be understood as "ongoing processes" rather than as stable objects (Dodge et al. 2009: 16). The creation of a map involves several practices, from data collection, to design, to the actual dissemination of the map. The knowledge and the information that maps communicate is realized in ongoing processes of negotiation and transformation. Social structures, discourses, and materiality around

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maps constantly change. Maps do not have a constant state; rather, we see them as processual and not as either absolute or objective. Each map represents a snapshot of the knowledge practices that first created the map. Having a background in design, we are keen to discover how this processualism might be transferred into visual means that reveal the frame of reference.

If maps are representing discourses and different practices, they should also look quite different. Of course, there is a significant variety in the design of maps. But it is also striking to us that maps have quite a high degree of unification, regardless of whether they are considered objective or critical.

Critical cartography contributes a very important theoretical point to map-making: Maps are constructed and, therefore, the meaning of the signs is related to the frame of reference. Given that we have been trained as graphic designers, we are responsible for visualizing this point of theoretical criticism, by literally making this construction visible. Our experience with visual means shows us very clearly that criticism, on the level of content, undermines itself when it relies on conventional design principles. Although there has been a theoretical shift in map-making of late, most visual practices still come from a diametral different approach, namely that of objectivistic cartography.

OBJECTIVISTIC CARTOGRAPHY

We understand the notion of objectivistic cartography as related to two things. Firstly, a philosophical belief in a general explanation and a search for universal order. Secondly, the conviction that things and objects that are part of this order can accurately be represented in a cartesian system. Interestingly, standard works of objectivistic cartography (Bertin 1974; Hake 1994) mainly deal with the second point. They

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define design guidelines that enable cartographers to represent a topic on the earth's surface as faithfully as possible.

The ultimate goal of cartographers like Jacques Bertin was to make maps effective. Maps are thought to be effective in the sense that they can be understood easily by the reader. Maps must be error-free in order to achieve such effectiveness. The necessity to remain error-free, in turn, called for good design principles. In his *Semiology of Graphics*, Bertin (1974) precisely describes issues such as the representation of the location, the selection of information, the best symbolization of certain data, the combination of symbols, and the type of map to be published.

Bertin considers two things to be indispensable to the creation of effective, error-free maps: Firstly, the simplification of information and graphic elements to a minimum and secondly, fixing them as unambiguous signs. Arguably, simplification is necessary to achieve conciseness in a map. Conversely, though, we know that abstraction, formalization, unambiguity, and visuality are tools that create a certain (subjective) idea of the world (Harley 1989). These ideas, however, come across as objective under the mantle of formalized design.

In his general theory, Bertin compares graphics with mathematics. He argues that graphics, like numbers, are part of a monosemic system. This means that graphics, and in our case symbols on a map, are signs with a unique meaning. What are the conditions that a graphical sign can have one distinct meaning? According to Bertin, all participants must agree on the meaning of the signs, which cannot be either revisited or discussed any further. Doing otherwise means that the map does not represent a stable reference point for a certain knowledge (Bertin 1974: 3). Only this agreement enables a collective reading of the signs and produces 'logical' meaning. The signs can only be fixed if the frame of reference is also stabilized, because the meaning of signs is dependent on the given frame of reference.

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Who are these participants that define that meaning? Until the 1980s, only a handful of groups had the privilege to do so: Cartography was an academic field, by and large, and was controlled by land surveying offices run by the state, the military, and the economy. Those groups had the authority to define the meaning of maps. It seems comprehensible that these groups also pursued their interests while doing so. It is important to acknowledge that their definition of the world does not necessarily correspond with that of other groups, minorities within a state for example.

We assume that every representation can be appropriated as evidence for certain statements and interests, regardless of whether it is an act of emancipation or a claim to hegemony. The relativity of the unambiguity and evidence of showing can be made visible and questioned, as Volker Pantenburg writes with regard to the essay film:

> "The photographic image tends towards tautology and operates with a deceptive evidence. However, through contact with a second photograph, by means of which clarity and unambiguity are 'disturbed' in favor of a relation and a relationship, it can advance to become an analytical instrument." (2006: 277)

Relating different visual statements can undermine the evidential power, which is fed by the immediate effect that the image has and can turn it into critical questions. In the following section, we contextualize this assumption with current approaches from the discourse of critical graphic design.

VISUAL REFLECTIVE CARTOGRAPHY

Our considerations tie in with critical and reflective design formats of the 2000s (Bardzell/Bardzell 2013; Blauvelt 2006). These considerations question the role of the designer,

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based on discussions around the principles of "designer as author" (Rock 2009) and "the designer as producer" (Lupton 1998). Design is no longer seen solely as a commercial service, but as content design and visual authorship.

This evaluation of graphic design takes place under such different names as "author design", "critical design"[8], and "reflective design" (Felsing 2021). The examples that we will present throughout the following pages represent a growing awareness of the roles played by designers in the definition of what becomes objective. They view their traditional role from a critical point of view. Their position corresponds with a general change within the designer's mindset. Designers have become increasingly aware of the autonomy of their creative statements. (Menne 2018)

How does this critique manifest itself in the designer's practice? Mazé (2009) argues that criticism in design is expressed in three, mostly interacting forms: Firstly, as a self-critical attitude towards one's own design practice. Secondly, as a criticism that focuses on conventions and paradigms within the discipline. Thirdly, this criticism appears as a criticism of social and political issues in general. The following examples refer to the last of these three forms, the content criticism. However, as described previously, we are interested in the visual form that criticism might take. The search for this visual form, and its relation to the content, is particularly characteristic for our consideration of the following examples.

08 This term was popularized by the exhibition "Forms of Inquiry. The Architecture of Critical Graphic Design," which was first shown in 2007. See Laranjo, Francisco Miguel. "Critical Graphic Design. Critical of What?". Accessed January 6, 2021. http://designobserver.com/feature/critical-graphic-design-critical-of-what/38416/.

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THE SUICIDE MAP

Most of today's maps follow the idea of the unity and homogeneity of a territory as a nation. Both the maps and the principal idea of such territories were defined in the 18th and 19th centuries. They still serve as the basis for most of today's maps, whether they represent geographical, political, or social issues. Therefore, these problems are presented in relation to territories that were defined two centuries ago. Although political and social issues are understood as dynamic and process-oriented, these dynamics are still hardly mapped. This means, in relation to the following example, that the certainty that an individual will live in a particular county for a significant period of time is by no means given today. The closedness of the territories is, therefore, not relevant for the comparison of state counties.

Bill Rankin, a cartographer and researcher from Yale, suggests that instead of large political territories, it would be more appropriate to use small "socio-geographical islands" as the basis for maps. He demonstrates this in his *Suicide* map. ○○○ The map visualizes the problem of suicide across different states throughout the U.S. Rankin argues that "there are huge differences in the suicide rate by race, gender, and geography." (Ranking 2005, 2010). According to Rankin, it makes no sense to talk about a "suicide rate for the United States". These rates differ largely based on the socio-geographical conditions of the people (ibid). If the frame of reference is too large, then a differentiated representation of the relations of race, gender, age, and territory is no longer possible. The visual statement is far too general which, in turn, can lead to the cementation of existing prejudices.

FIG.1–3

Rankin created three different maps in order to avoid this generalization. One for native Americans, one for afro Americans, and one for white Americans. Each map again is divided by gender.

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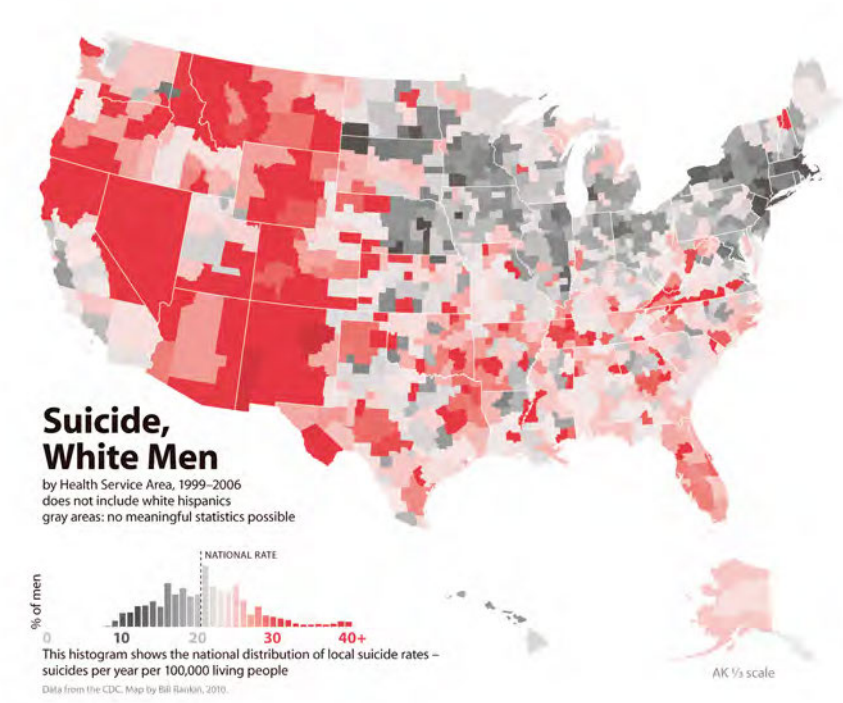

▲ 1

● FIG.1-3 ▶ The distribution of suicide rates across the United States for white, black and indian men. The colors of the map have been changed for this publication. For a view of the original please visit http://www.radicalcartography.net/index.html?suicide. Biill Rankin, 2005, 2010.

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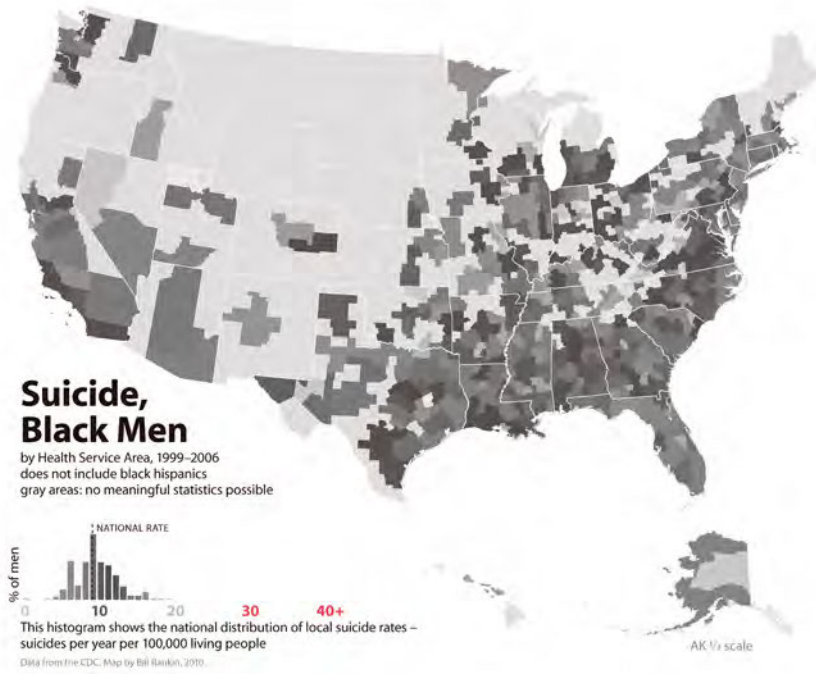
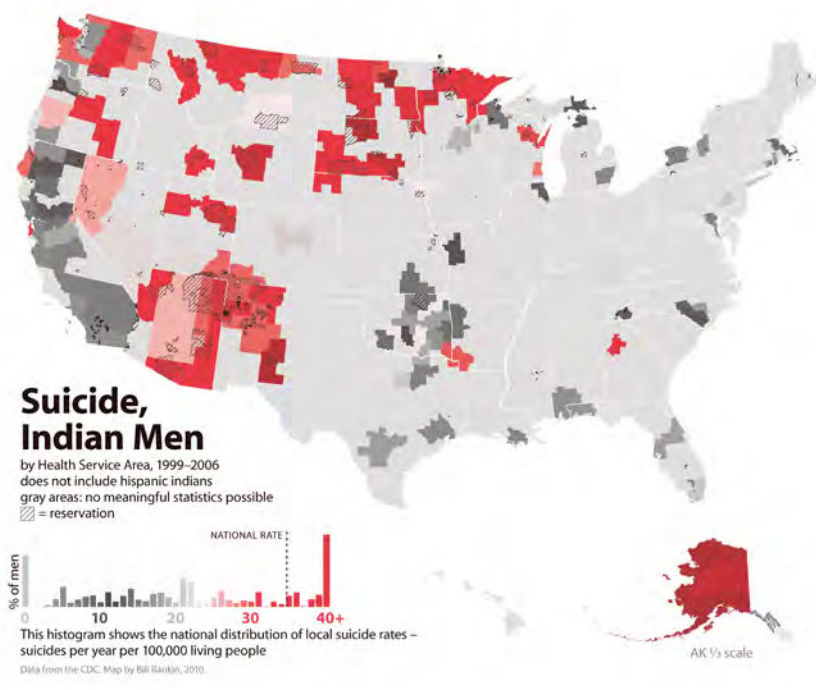


▲ 2



▲ 3

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Rankin chose a choropleth map for his visualization. This type of map uses state districts and landmarks to visualize some statistical aggregation (in Rankin's case suicides). Each county is represented as an abstract polygon and filled with a color that indicates the suicide rate. By doing this, Rankin creates a visual argument that there exists a relation between suicide rates and the county in which people live. The problem that the frame of reference of the country is too large is, thus, simply shifted to the county level. Whether this solves the problem of representation of individual population groups is, in our view, questionable. In this visualization, Rankin reveals the problem in all its complexity and encourages us to continue to search for better solutions.

MAP & JERRY

A central theme of critical maps is the visibility or invisibility of minoritarian and majoritarian groups. Such critical maps try to make communities visible that are not represented within the official order, through state maps for example.

It is crucial to consider maps from a critical perspective, not just in the context of their current use. According to Sybille Krämer (2003), they fulfill a constitutional function: as media, they are fundamental for the justification and demarcation of territories. Maps are not neutral tools, but are instead constitutive of the enforcement of rules, laws, and ideologies. For example, by making specific sub maps, the absolute interpretive authority of the map can be critiqued, and an offer can be made for differentiated, omitted, or overlooked contexts. One example of such an invisible area is the Awansouri-Ladji district located in Cotonou, the economic capital in the West African country of Benin. The district is not depicted, neither on any official city maps nor on Google Maps.[9]

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Map & Jerry **created the first map of the area in 2018 and this was carried out by FabLab[10] Benin and OpenStreetMap[11] Benin.** ○ **The project included 40 local residents of different ages who collected the basic data of the map, including points of interest, existing infrastructure, and businesses.** FIG.4

Most of the street names could be determined by the participants from the "bottom-up", given that the addressing of the buildings and streets has not been carried out by the government agencies. This also made clear the colonial influence that the regular, official maps operated under (Choplin/Lozivit 2019). Viewed from this perspective, the project formulates a clear critique towards the hegemonic claims of official maps.

However, this critique on the content level is undermined at the visual level. Due to a lack of time and budget, the project used the graphical specifications provided by OpenStreetMap. This is a highly codified visual language that is based on Western standards that leave little room for the expression of cultural specifics. These, in turn, we consider to be instrumental in helping communities identify with their maps. This issue became particularly clear while finding an appropriate symbol for places of worship related to local voodoo culture.

09 Awansouri-Ladji appeared on these maps as a "green" area with no roads, houses, or infrastructure by the time the project was carried out. By the time that this article was written, however, the district did appear on Google Maps.

10 The concept of FabLab (a term derived from the contraction 'fabrication laboratory') appeared at MIT in Boston in the late 1990s. A FabLab is a space for digital innovation and technological democratization that ensures the promotion of, and training to use, innovative technologies. A FabLab is generally equipped with open-source software, hardware, such as a 3D printer, to manufacture objects and conduct projects (hence also the term makerspace to designate these spaces in the English-speaking world). Blolab is the first FabLab in Benin.

11 The OpenStreetMap (OSM) project is a mapping project that aims to build a free geographic database of the world. It relies on volunteers organized in groups around the world, as it did in Benin.

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The symbol provided by OpenStreetMap, which was ultimately used on the map, shows a person on their knees praying. Choplin and Lozivit (2019) criticize this choice retrospectively, because "the Voodoo cult does not imply prostrating oneself before a god. It values the links with the natural elements (fire, earth, wind, water)." (ibid, 25) They further argue that it would have been desirable to include the community more in the design process of the map.

COLLEGE TOWN

Another example that provides criticism on the content level is the map *College Town* by Bill Rankin. However, this radical map comes very close to extending its critique to the visual level. ○ FIG.5

In his map, Rankin designs a counter-vision to the objectivist concept in which territories are tied together to establish identity. The objectivist map suggests wholeness and the continuity of the territory both internally and externally. Here, too, the 19th-century idea that territories are homogeneous in themselves is predominant.

However, Rankin's critical perspective emphasizes the differences within a territory. These differences, in turn, threaten the territory's recognizability. Rankin's radical cartography depicts Boston as a university town. Rankin defines a different frame of reference, quite unlike the official maps which show only the smallest version of the university campus, including the most important buildings. His map shows all of the land that is owned or leased by the city's 52 colleges and universities.

The map, thus, reveals that far larger areas of the city belong to the universities than is usually shown. Rankin's map emphasizes the university's dispersed presence.

This alternative view provided by Ranking on

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Boston as a "student city" would have become even more clear by juxtaposing it with more common maps. Although this is suggested through an offered Google Maps link, the maps differ greatly in their visual means, rendering a direct comparison hard.

In the following section, we would like to examine a project that uses such juxtaposition quite successfully.

REDLINING MAPS: AN EXAMPLE OF VISUAL AND SOCIAL CRITICISM

For us, the examples presented so far show that criticism on the content level can undermine itself if it relies on conventional, objectivist map design principles. At the very least, the visual layer can contradict the critical content, as seen in the example of *Map & Jerry*. We will present two examples in which the critique is applied both in terms of content and visual means.

Redlining is the practice of categorizing residential areas in terms of their investment security. In the U.S. of the 1930s, various banks and other lenders began to grant mortgages on the basis of such maps. This mainly affected minorities living in poorer parts of the city, who were denied credit because of their ethnicity. Since the 1960s, Redlining Maps have been associated with disinvestment, racial discrimination, and neighborhood decline (Harris/Forrester 2003). The practice continues to have an impact on the prosperity of certain minorities even today, such as among African Americans living in poorer neighborhoods for example. Two actors that recently explored *Redlining Maps* are the University of Richmond's Digital Scholarship Lab and data artist Josh Begley.[12]

12 Begley, Josh. "Redlining California: 1936-1939". Accessed January 6, 2021. https://joshbegley.com/redlining/.

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FIG.6 **The Digital Scholarship Lab's critical visualization consists of a juxtaposition of historical and current map materials. ○ The project combines nationwide overviews with detailed views that can be enlarged down to the level of individual streets and residential buildings. By zooming in, the user can see the 'mortgage security' categorized from A (highest) to D (lowest) as well as a historical description of each area. The maps were created by agents of the federal government's Home Owners' Loan Corporation (HOLC) in liaison with local real estate professionals (lenders, developers, and real estate appraisers).[13]**

One of the historical descriptions of a D-Zone reveals the discrimination clearly. The area is described as "characterized by detrimental influences in a pronounced degree, undesirable population or an infiltration of it." The recommendation was: "refuse to make loans in these areas [or] only on a conservative basis."

The critical visualization renders the categories visible on each of the zoom levels. Thus, the project provides a general overview of the statistical distribution of categories per territory, on the one hand, while each territory is substantiated and contextualized with very specific facts and official documents on the other.

The interface design also supports the intertwining of history and the present. The user can gradually control the overlay of the historical maps with OpenStreetMap. The interface offers three options: "Full Map", "Graded Areas", and "Polygons". While the historical map effectively *covers* the present in the first option, in the last mode the historical map is completely dissolved and merges into the present. By controlling the degree of overlap between past and present, the user is invited to actively consider these two levels together.

13 In the color-coded maps, the highest grade of 'A' (green) was an area with minimal risks for banks and other mortgage lenders. Areas receiving the lowest grade of 'D', colored red, were considered 'hazardous'.

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An associated project *Not Even Past: Social Vulnerability and the Legacy of Redlining* reinforces the actuality of the issue further by juxtaposing the redlining maps with contemporary health disparities. As can be seen in ○ the redlining districts are put in relation to the Center for Disease Control's *Social Vulnerability Index* (SVI). ○ The SVI is a widely used indicator for FIG.7 social and economic resources that enable a community to face human and natural disasters. For example, the index shows that people of color are more exposed to the COVID-19 virus due to their social and economic disadvantage. The project contextualizes current inequalities by combining the index with the historical redlining maps. It becomes clear that the practice of redlining has shaped certain areas for generations.

Data artist Josh Begley has also developed a visualization and contextualization of historical redlining maps in parallel with, but independently of, the *Digital Scholarship Lab*. It differs from the Lab's approach essentially in that he uses the popular program Google Earth to overlay the maps. In doing so, he also shifts the historical problem to the present, but possibly allows a broader audience to refer back to a process that is still relevant today. Begley's work also provides deeper insight into the problem in that he provided a historical description of each area.

DISCUSSION

We would like to discuss our initial hypothesis now that we have completed our presentation of different examples from critical cartography: Criticism on the content level undermines itself if it relies on conventional objectivist, map design principles. This thesis is contradicted by Bertin's objectivist concept, with which he intensified the question of the separation of the content (the information) from the form (the means of the graphic system)

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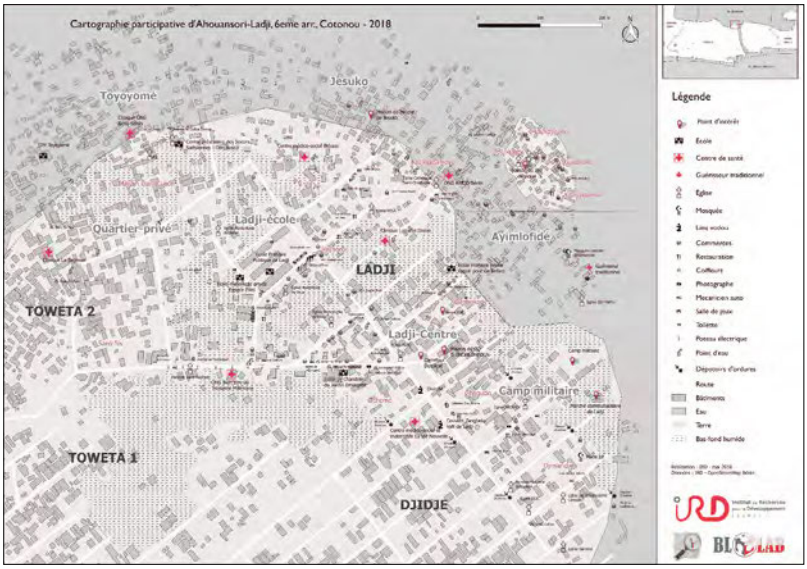
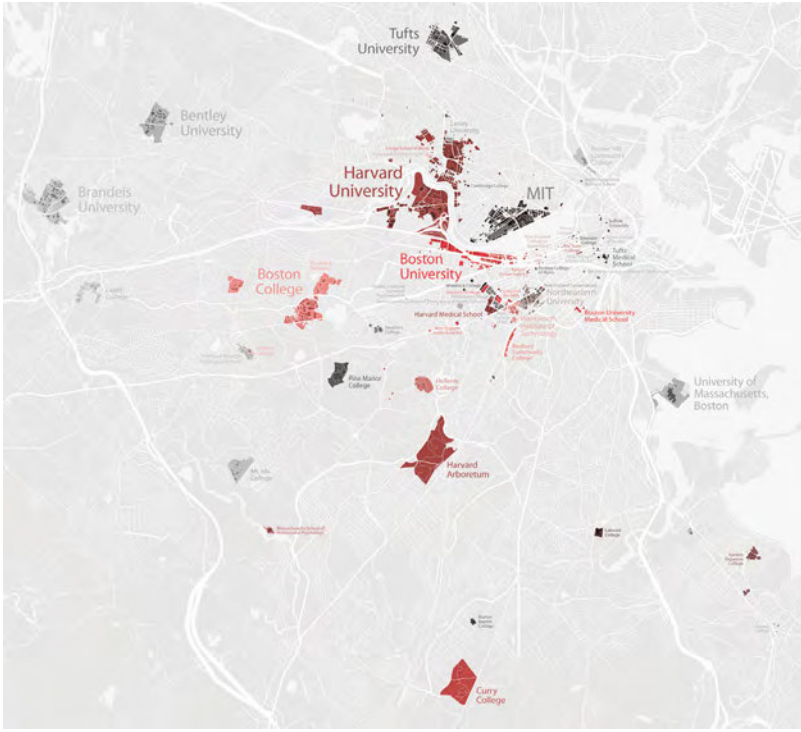


● FIG.4 ▶ The map developed by the Map & Jerry project showing the Awansouri-Ladji district in Benin. Map & Jerry, 2018.



● FIG.5 ▶ Detail from the College Town map showing the distribution of different universities across Boston. For the complete map please visit http://www.radicalcartography.net/index.html?boston_campus. Bill Rankin, 2007, 2009

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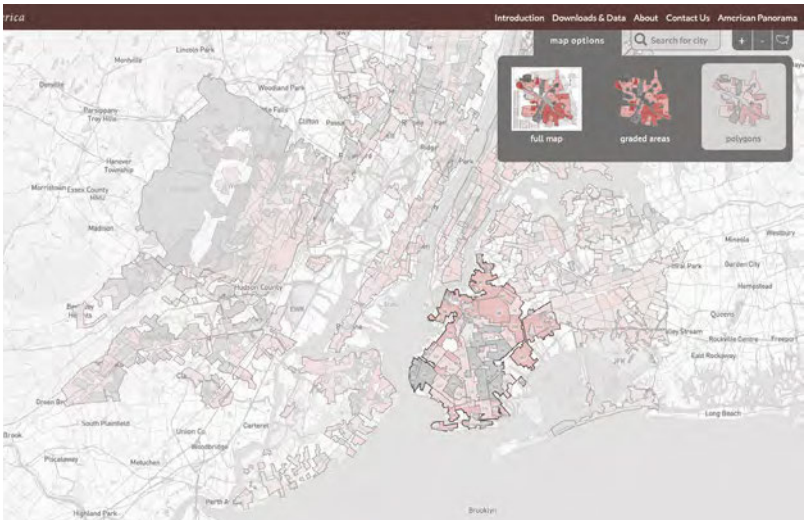
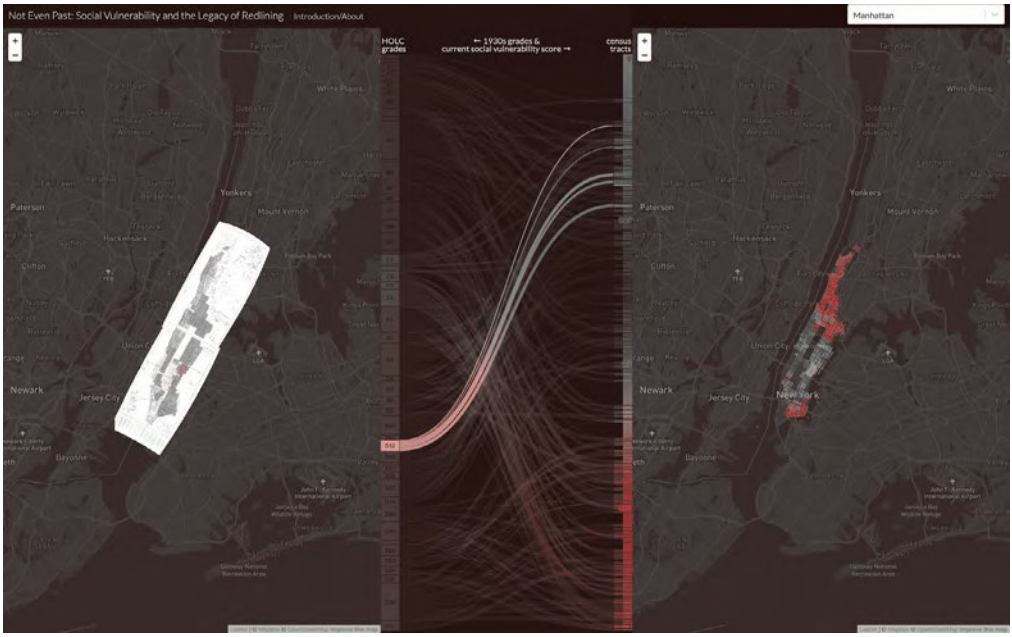


● FIG.6 ▶ The juxtaposition of historical redlining maps with current OpenStreetMap data. Digital Scholarship Lab.



● FIG.7 ▶ The redlining districts put in relation to the Social Vulnerability Index [SVI]. On the left side, it shows central parts of Manhattan which were classified as 'hazardous' in 1930. On the right side, it shows that the same areas became strongly gentrified. Digital Scholarship Lab.

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(1974: 12). From today's perspective, this separation is problematic. Various authors have proven (Ganslandt 2012; Krämer 2003) that the design process is itself content-based; it does not just add 'form' to an already existing content. The visualization is constitutive for the mapped data. Therefore, the medium of the map not only represents data, but it also simultaneously produces data.

From the traditional perspective of the humanities, media are understood as invisible. This is expressed in the metaphor of the Crystal Goblet (Warde 1930) which enables, only limited by the materiality of the media itself, any transmission of information. This understanding is reflected in Bertin's idealistic view that "thoughts remain constant, regardless of the sign system into which they are transmitted" (1974: 12). In contrast, the perspective of cultural studies presumes the "supremacy of the medial" (Krämer 2003: 80). Here, the medium is no longer understood as something transparent and serving, but as an independent, all-determining entity. Viewed from this perspective, the media not only transmits meaning, but also generates it.

Maps are not neutral communication channels; they are involved in the production of meaning. The meaning to be communicated is constituted by the medium; namely through the material map and through immaterial signs. Therefore, we understand maps not only "as an instrument for creating nations and identities" (Michel 2010: 9). Maps are also pictorial acts (Bredekamp 2011) with their own reality-producing force.

If we apply the essential ideas of critical cartography onto adequate visualizations, then these will have to visually reflect the interrelationships of actors, artifacts, and signs.

A counterargument to our thesis might be raised with regard to the examples presented, however. We argue that criticism must be made on the content and the visual levels so as to not contradict each other. However, one could argue that visualizations are already often

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quite complex and hard to decode. Visualizations that break with the conventional (objective) stylistic devices could unnecessarily complicate the reading of the content's critique.

We would, therefore, like to advocate that the visualization's frame of reference must be explained in as much detail as possible. Information that enables the temporal and spatial classification of the data facilitates the contextual classification for the recipient. This not only enables them to understand the visualization, but also shares the responsibility for the content (and does not simply demand its affirmation). We argue that the mere demand for simplification (Bertin 1974), in order to achieve efficient representations, patronizes the recipient.

Another difficulty of visual criticism is that the paradigms of graphic visualization have hardly been studied so far. First investigations on the Western convention of the homogeneity of the surface and the continuity of the grid can be found in *Visual Coexistence: Information Design and Typography in the Intercultural Field* (Baur and Felsing 2020). According to Bertin, the surface (of the "information carrier") is homogeneous and the setting of signs is also homogeneous (1974: 52). Within the surface, the presence of a sign signifies the presence of the fact to be represented. Conversely, the absence of the same sign can express that the fact represented are not present in that place.

However, reality is much more complex than "factually present" and "not present", it is much more heterogeneous. The redlining project visualizes this complexity through the diachronic perspective. It shows that the respective social meaning of urban spaces *changes* (over a period of three generations), but also *persists* in certain places. This gives rise to ambiguous references that can completely contradict each other. And this corresponds to the social differences that are continuously renegotiated.

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What are the gains associated with critically reflexive map visualization? Reflexive visualizations allow us to question the apparent objectivity of representation and to interrupt the realistic reading of the representation in favor of a questioning. They offer an in-depth look at historical, social, and political contexts and relate them to the now. Playing with the shifts between frames of reference – such as current and historical ones – leads to a different, interrogative way of depicting in which the recipients can be involved. Selected, curated juxtapositions are important because isolated representational logic creates a deceptive weight of evidence. It has been pointed out by various authors that the power position of the speaking subject should not be underestimated, even if representations allow for different interpretations (Muttenthaler/Wonisch 2007). However, by juxtaposing multiple frames of reference in the representation, the power of showing is distributed among different actors.

CONCLUSION

Our chapter has focused on the question of whether the authors of the map visualizations perform criticism and what design means they use to do so. Our hypothesis was that a visual form that is appropriate to critical cartography would also reflect upon, rather than simply adopt, prevailing conventions of representation. Then, we argued that visualization is constitutive for the mapped data. The medium simultaneously produces that which it represents. Using the example of redlining maps, we were able to show that critical and visual reflection results from the juxtaposition of historical redlining maps, which stand for discriminatory practices around housing and current maps. Thus, the interrelationships of actors (such as the inhabitants and investors), artifacts (historical redlining maps and official area descriptions, Google Maps), and

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signs (especially boundary lines and colored areas) become clear. The redlining maps projects illustrate that the interpretation of visual map signs depends on the specific frame of reference with which they are placed in relation. This evidence can be broken in favor of an interrogation of the historical and social contexts of showing, whereas an isolated logic of representation generates a deceptive evidential power – regardless of whether this is claimed for hegemonic or critical-emancipatory interests.

FUTURE RESEARCH

The knowledge acquired from forms of critical cartography and map visualization flows into our future research in the field of digital image archives. As part of the Sinergia project *Participatory Knowledge Practices in Analog and Digital Image Archives*, funded by the Swiss National Science Foundation (2021-2025), our interdisciplinary team is developing participatory forms of use on the example of three collections of the Swiss Folklore Society's photo archive. One of these collections is *The Atlas of Swiss Folklore*, which constructs a specific image of Switzerland through the cartographic location of cultural patterns. The pictorial statements will be contextualized by other types of maps to be able to make references back to the diversity of the groupings – for example, with regard to language boundaries, dialects, and religious affiliations. The project is collaboratively led by Walter Leimgruber, Peter Fornaro, and Ulrike Felsing. Max Frischknecht will develop the *New Requirements of Digital-Participatory Knowledge Visualization* as part of his PhD studies.

→VIDEO LINK

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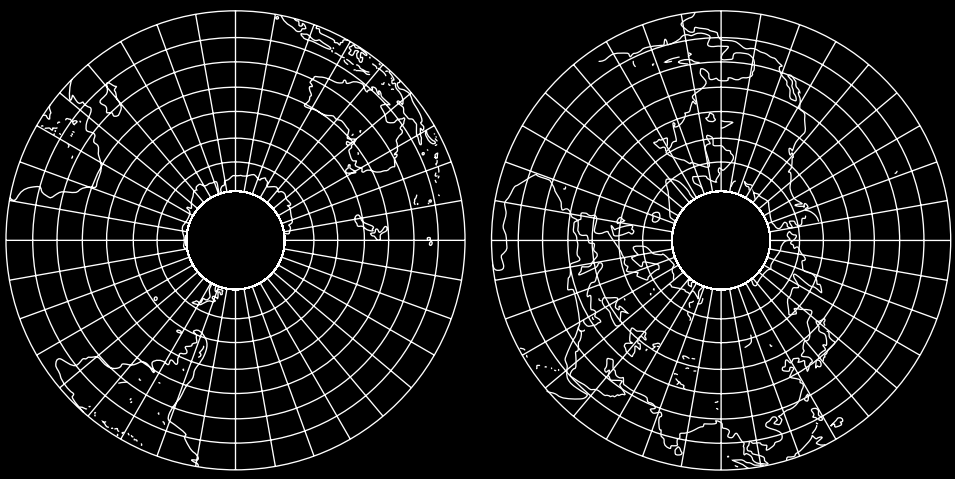
THE DIGITAL MEMORY OF PALMYRA–



Christine Schranz

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Maps and Open Source Data as Decolonization Tools

The following essay[1] focuses on both the potential and influence that maps and mapping strategies have in a time of political and geopolitical crisis, disaster, and wars, particularly in the Middle East and in Syria in specific. The conflicts in the Middle East have notably demonstrated the Internet's importance for information gathering and sharing, as well as surveillance and intimidation. The use of maps, satellite images, photos, or other open data collected from the Internet may help to monitor, secure, rebuild, and to restore cultural objects in war-torn regions in times at which physical access has become dangerous or impossible, and where cultural heritage has been lost through terrorist acts. Examples of such open databases include ASOR's Cultural Heritage Initiatives or 3D models of damaged architectures of the ancient city of Palmyra. The following examples and strategies discuss different uses of data, whether it be capture, production, or data mining and management.

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Taking a map-centered view is fruitful from at least two perspectives: cartographic thinking as a concept of decolonizing, and maps as a tool to assist in geopolitical crises. Maps have become powerful in four particular ways: As an epistemic object, as a tool for spatial analysis, as a blueprint, and to claim ownership. Furthermore, maps provide new access to knowledge and promote knowledge production alongside the increase in georeferenced data (since Web 2.0). I will argue, first, that open data and mapping strategies can contribute to the formation of a new understanding of a digital memory of Palmyra that is emerging within a broader context of critically rethinking "digital imperialism". Second, I will reflect on the implications for a decolonizing of data politics and the emergence of a digital culture through new technologies. Third, I will argue that maps and mapping can be used as tools for memory, reconstruction, criticism, or artistic intervention. A tremendous amount of effort has been placed in archiving, collecting, and distributing satellite imagery and open data through new spatial technologies, particularly in endangered areas. Open data can contribute to construction of a digital memory and has the potential to make artistic and cultural heritages immortal. In the digital world, such projects and archives should be open, freely accessible, and reusable since culture belongs to everyone. But who should build, own, and archive these data sets?

A SHIFT IN MAP-MAKING

The emergence of critical cartography in the 1980s (particularly with Harley 1989; Harley/Laxton 2001, i.a.) and current discourses about decolonizing maps have also coincided with new approaches to map-making (see Wood 1992; Crampton 2010; Dodge 2016; et. al.). Since this shift, mapping has become a powerful tool of resistance by minorities to top-down authorities as knowledge producers (or gate keepers).

01 This essay's core concept was mainly developed during an international research visit by the author to the Winchester School of Art, University of Southampton in the autumn semester of 2017 and was first discussed with the Archaeologies of Media and Technology (AMT) research group. I am very grateful for the comments received at the gathering and would especially like to thank my hosts Ryan Bishop and Jussi Parikka, and my colleague Jennifer McHugh.

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As a consequence, maps are being created that are not just intended for spatial orientation and navigation purposes. On the contrary, such maps produce new kinds of epistemology and knowledge, be it, for example, through participation, appropriation, or counter-knowledge. Such counter-maps (Peluso 2011 [1995]) are commonly created and represent an important tool for enforcing the rights of socially disadvantaged people resulting from power, hegemony, and top-down claims (land registers for the clarification of property rights).

A second, even bigger shift in map-making emerged with Web 2.0 in digital cultures. New forms of interaction appeared between users, networked infrastructures, and the space around us alongside the development of the geospatial Web (see Ash/Kitchin/Leszczynski 2019). Users are no longer just passive but are instead becoming designers of their world (prosumers). Information is geotagged in the Geoweb to physical space via mashups and location-based services and applications. Maps are about to become interfaces to locate data and information with the growing importance of georeferenced content on the Internet in the West. In other parts of the world, the move to mobile devices with GPS trackers has enhanced an existing governmental capacity, evidenced by various states enacting territorial surveillance like Saudi Arabia or Turkey (see Pickles 2004). Those new interfaces have been triggered by the function of locality of person and device, changing the relationship between users, machines, and space, and this directly affects the use of map tools. As a result, places are becoming increasingly comprehensible as a network of relations and connections. Furthermore, there has been a democratization in map-making. This has caused a clash between institutional vs. user-generated/produced geodata with an emphasis on proprietary vs. open data. Users are able to create their own map mashups out of spatial data, since (top-down) institutions like Google Maps spreads its APIs through the Web. Although democratization

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is being established, it still excludes large sections of the population due to insufficient internet access and/or a lack of knowledge and devices.

However, there are alternatives to the supremacy of top-down forms of map-making, like Google Maps, through Volunteered Geographic Information (VGI) cartography (see Goodchild 2007). One example of an open and collaborative tool is OpenStreetMap (OSM). This free online map was founded by Steve Coast and is based on the wiki principle (Open Data Commons and Open Database License). The map content is created and brought together by the crowd and is put onto a cartography Commons. Specifically, satellite images are digitized and existing materials are collected from public sources. The data are available as raw data (vector-based accessible data), which allows for the extraction, editing, and creation of new forms of maps, and they may be used free of charge and license-free. One critical drawback with Open Source GIS is that only a minority contributes to the cartography Commons. Commons are not only important in terms of independence, but they are just about absolutely necessary when institutional engagement is either missing or where it is failing. This potential problem is related to the intention to produce, and the actual production of, map material for and by developing and emerging countries, for example.

A remarkable case is the *Haiti Map* (2010) which has changed humanitarian aid from the ground up. A high-resolution satellite image of Port-au-Prince was usable just a few hours after the earthquake and, as a result, several hundred volunteers had supplemented the online map with life-saving information after only a few days (see Schranz 2018). This map was only possible with the tremendous increase in georeferenced data and new forms of map-making. A cartography Common, known as the Humanitarian OpenStreetMap team (HOT), was founded after the provision of this

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very effective form of assistance to Haiti, with a view to assisting in cases of natural disasters and crisis situations (see also Chapman 2015). The technological possibilities to create Common-based, bottom-up initiatives like the Haiti Map have fostered a change.

With open data, there have also been remarkable shifts in dealing with destroyed, stolen, or damaged art and cultural heritage in conflict-riddled zones. This is reflected in the Middle East, where alongside the damage and destruction of cultural heritage there has also been an effort by local activists and partners in archiving, collecting, and distributing open data about the destroyed artefacts like American Schools of Oriental Research (ASOR) or the Million Image Database. The ASOR's Cultural Heritage Initiatives is an international collaboration that undertakes projects to document, protect, and preserve the cultural heritage of war-torn Syria, northern Iraq, and Libya. The Million Images Database collects millions of images of threatened cultural objects that have been captured on an easy-to-use, 3D camera by volunteers in conflict zones throughout the Middle East and North Africa.

MAPS AND MAPPING IN TIMES OF POLITICAL AND GEOPOLITICAL CRISIS

For the first time in history, it was possible to see things close up, access to which had not previously been allowed, was impossible or could only be undertaken at high risk; this was done through the use of digital Geographic Information Systems (GIS). Internet activists discovered, for example, the CIA's secret prisons, cultural crimes being carried out in the Middle East, or revealed the impact of the Gulf War by using satellite images and open maps. Furthermore, the war started to become separated from the space in which it was happening. It became a technological war with drones and missiles directed at their targets

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remotely, far away from the conflict zones. Laura Kurgan, from the spatial research department of Columbia University in New York, has elaborated on how digital maps and satellite images had a significant influence on the Gulf War. Back in 1991, Kuwait built up a GIS database as a planning tool within its surveillance regime by combining satellite images with digital maps. Military intervention and the rebuilding of post-war cities happened in an entirely new way through this database (The Kuwait National Database, Intergraph Corp.). Firstly, it was possible for the US to plan their counter-invasion and targets from far away, from a desktop. Secondly, the images were conveyed in real time to the public. Thirdly, the Gulf State used their database as a blueprint to preserve and to reconstruct the damaged cities (see Kurgan 2013: 90).

By layering the geographic information, each item or list element on the Internet has a physical location, a georeferenced grid of pixels. Therefore, it may be associated with a geographic information system and be rendered visible on a digital map. Once localized, data can be related to various elements and layered onto maps. Although the Internet has always been geographically anchored by IP addresses, router addresses, domain names, and so on, the move to mobile devices, which also have GPS trackers, has caused the Internet's georeferenced content to become spatially organized. This organization has become a form of knowledge, creating content, and ordering as a form of authority, referring to geographic coordinates. This georeferencing has transformed the map into a universal interface tool to access its content. The reasons for the paradigm shift are, on the one hand, the emergence of GeoMedia, and the new possibilities offered by combining open data, satellite images, and mapping on the other.

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The Global Positioning System (GPS)[2] created in the 1970s by the United States Department of Defense triggered a boom in space-based services, such as online maps or satellite imagery. When GPS first became available for private purposes, location transmissions were still very inaccurate, not least because of interference on the part of the military for whom the system had been originally developed. At the same time, GPS changed how space and location are both used and looked at. As I pointed out in *Die Karte als Interface* (Schranz 2017), satellite navigation systems for locating and recording georeferenced data have become dramatically more important. The world around us has become increasingly comprehensible with the help of satellite images. The sheer size of space is reduced such that it fits on a screen. Satellite images are compelling in their use as visual interpretation, although reading the recordings requires specific expertise and there is a danger of manipulation. It has become common to see the world from above through the many circulating satellites that exist. Images of the Earth's surface are being taken from government and commercial satellites and, more recently, by drones as many humanitarian organization do, since satellite images are not easily accessible and are costly.[3] Although these pictures are highly vulnerable to abuse, examples of which we shall explore later, the monitoring and space-analysis of satellite imagery over an extended period have been useful in locating and assessing damage in crisis or conflict zones in the Middle East. Palmyra, for example, was a cultural heritage site that was no longer accessible after ISIS's occupation. There was no secure information about the damage and destruction of the site (apart from the propaganda footage of ISIS). Therefore, the United Nations was forced to

02 GPS is a satellite-based navigation system that can be used for positioning and navigation for both static and mobile devices.

03 https://www.elrha.org/project-blog/scaling-open dronemap-for-the-humanitarian-sector/

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confirm the damage by using satellite images: UNOSAT[4] referenced satellite images of the heritage site before and after local people commented about explosions in the area.[5] ○

FIG.1

THE TRUTH BEYOND MAPS AND MAPPING

As I have pointed out previously, maps have had a significant influence on war as visual epistemes and through the use of open data and satellite imagery.[6] In their small publication, *Before and After. Documenting the Architecture of Disaster*, **Eyal and Ines Weizman elaborate on images taken from satellites or drones "which also turns spatial analysis into an essential political tool" (2018: 11). At the same time – with the use of the Internet as a propaganda tool for terrorists – it has become hard to trace the truth, given how much fake news is currently in circulation. The international collective** *Forensic Architecture* **– founded by Eyal Weizman and based at Goldsmiths, University of London – seeks to investigate the damage done in Homs by monitoring open data. In July 2013, different aerial images of Homs were circulated throughout the war-torn districts when it had been secured by the regime. The Babal-Sbaa media centre published pictures of the al-Khalidiya district on Facebook. The opposition Shaam News Network (SNN) released other photos taken by a drone purporting to show the same neighborhood. Those pictures were credited and republished by Getty Images.** *Forensic Architecture*

04 The United Nations Institute for Training and Research's satellite-analyzing and monitoring program.

05 https://www.unitar.org/cultural-treasures-ancient-city-palmyra-destroyed accessed November 15, 2017.

06 This goes back to the famous map of *Carte figurative des pertes successives en hommes de l'Armée Française dans la campagne de Russie 1812-1813* by Charles Joseph Minard (1781-1870) to the Napoleonic campaign in Russia around 1869.

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analyzed street-level photos and aerial images of the al-Khalidiya district in order to investigate what damage had truly been done, since the images provided by the regime and the rebels were different. By geo-locating the area, they could prove that the SNN pictures showed a different area, the Karm Shanmsham district. ○ FIG.2 This illustrates how manipulative and difficult georeferenced data can be for users. Information is more easily manipulated with user-generated data, and the community's influence through social bots on the high standards usually shown in investigative journalism should be obvious. Republishing data without verification of authorship or proofing credits makes the public believe that trustworthy agencies have supplied the images. (see Dische-Becker/Hisham 2014). Open data and its reliability should also be questioned, as well as fake news, and high standards of journalism should be sought out.

As I have suggested previously, maps are forms of representation that aim to reproduce space as accurately as possible; however, maps are not just objective tools, but are instead a form of power (see also Monmonier 2018), self-interest, and political ideologies. Maps have always been a tool of and for authority, and those who drew or had the money to commission them have often been very powerful too. In digital cultures, a radical change has happened to cartography as a discipline, as well as to maps as a medium. With open data and access to online GIS, maps and mapping have become an everyday tool. Nowadays, it is a common practice to produce one's own maps or to add locations to existing maps. However, the hegemony of maps still exists, even with this more democratic approach. What has changed is a shift from the public function of institutions, like the National Geographic Society, to private companies, like Google. Maps have become increasingly important since Web 2.0, and the online and free of charge mapping service Google Maps dominates the market. Google's

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supremacy and global influence points to one fact above all: today's cartographers are computer scientists. In 2012, the British historian Jerry Brotton pointed out that all maps will probably be produced by machines, codes, and algorithms in a few years. If this is true, then future cartographers will not even be computer scientists, just 'computers'. Today, it has become a fact that maps are built by algorithms and AI (Artificial Intelligence) without verification. Another critical point is that Google keeps the codes on which the maps are based secret: "For the first time in recorded history, a world view is being constructed according to information which is not publicly and freely available. All prior methods of map-making ultimately disclosed their techniques and sources, even if, as in the case of sixteenth- and seventeenth-century mapmaking, they tried – but failed – to withhold its detail from their competitors" (Brotton 2012: 431f). Although, the downstream map products and services of Google are based on raw geodata, Google provides a rendered view of their maps (in grid converted public vector data), which makes it impossible to revise the map. In other words, Google's map services are proprietary and based on a closed data system. It can be concluded that Google is pursuing the commercialization of maps solely for financial gain, since the maps serve as an interface to their own database of maps/geodata.

DECOLONIZING STRATEGIES THROUGH CARTOGRAPHICAL THINKING

The idea that maps are an objective and scientific image of the world is still a widespread myth. However, this dominant worldview is influenced by a Western cultural hegemony. Since the Renaissance, we have been thinking cartographically in ways that have shaped the Orient's geopolitical imagination. Historically, an allocentric worldview prevailed during the Renaissance (with Europe in the center),

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● FIG.1 ▶ The destruction of the Temple of Bel. Image analysis UNITAR-UNOSAT, 27 August 2015 and the destruction the Temple of Baalshamin. Image analysis 26 June 2015.

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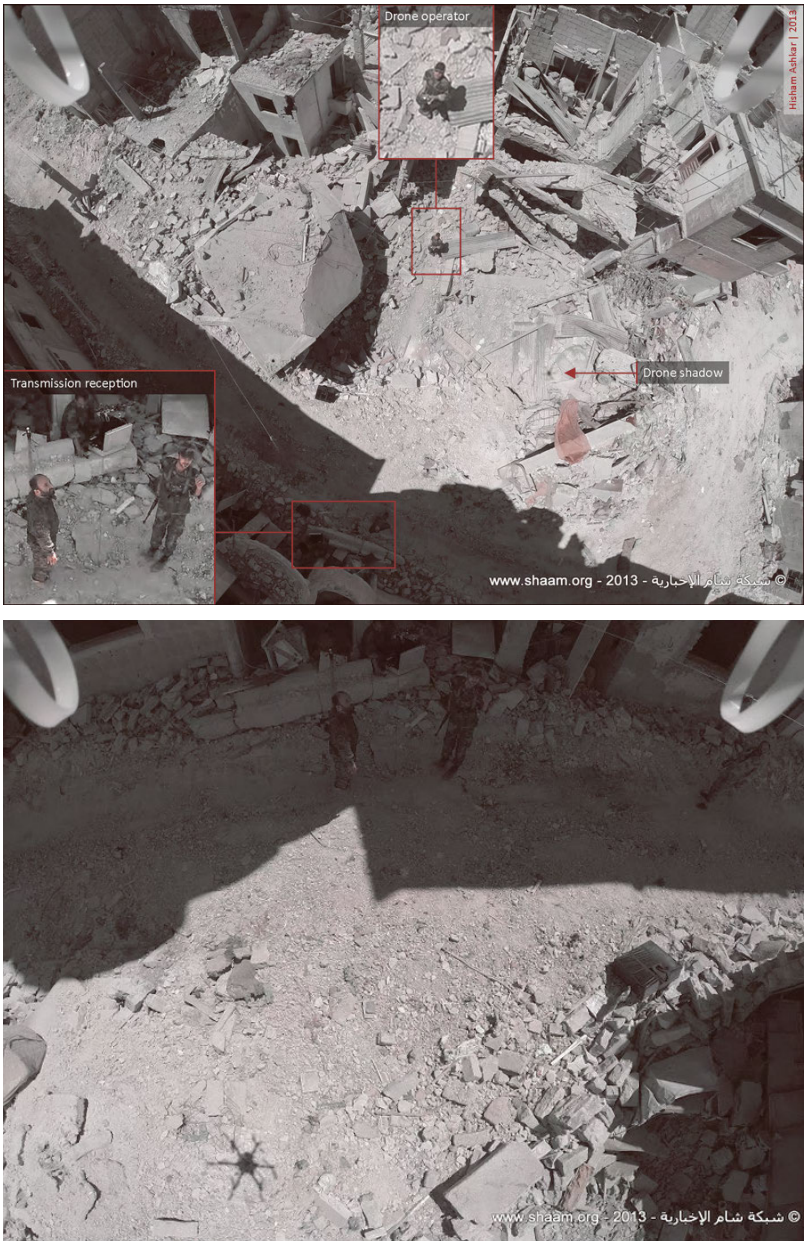

● FIG.2 ▶ Fake pictures made by SNN with drones: "Screen capture of an aerial image published by SNN on July 29, 2013" and "Close-up of the men visible in an aerial image published by SNN show the presumed drone operator, transmission recipient and shadow cast by drone".

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leading to a north-south orientation and a zero meridian through Greenwich. This Eurocentric perspective builds upon the tradition of the Mediterranean-based cartography of the Greeks and Romans. Yet, the decentralization of Europe and correspondingly the West is an essential critical impetus for rethinking colonial space and bottom-up movements. Early and remarkable maps, which questioned the standard mentioned above, include the *Dymaxion Map* (1943) from the US-American designer, Richard Buckminster Fuller (1895-1983) or the *Peters-Projection* (1974) by the German historian and cartographer, Arno Peters (1916-2002). Their design, which uses exact land masses, are considered as an alternative to the common Mercator map, which shows a Eurocentric perspective. Space, spatial strategies, and cartographic thinking occupy a central position within (post)colonial approaches. The provocative thesis by the American-born Palestinian Edward Said (1935-2003) that the Orient is a Western construct is more relevant than ever within critical cartographical thinking. He argued that the Orient was invented as an ideological tool for the West to justify imperialism and colonialism (see Said 2003). His thesis, though heavily debated by both the West and the East, was a key point of departure in postcolonial studies and a critique of Eurocentrism. As Shalini Randeria has shown at the beginning of the 20th century, Europe owned over 85% of the globe's territory in the form of colonies, protectorates, and territories (see Randeria 2010: 177). In other words, this immense geographical appropriation is brought into sharp focus by geographical practices like cartography. In this way, cartography transforms annexed spaces into legible, ordered and, therefore, controllable imperial territories.

Google launched the Google Cultural Institute (GCI), today Google Art & Culture[7] (Yeo/

07 https://artsandculture.google.com/

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Schiller 2014: 47) in response to the plundering of the National Museum in Baghdad. The project's aim is to digitalize and to make cultural artefacts available on the Internet (as yet, there has been no indication on the Internet that this has happened with the objects of the National Museum, see ○: "At a time when cultural institutions should be decolonized instead of googlified[8], it is vital to discuss a project such as the Google Cultural Institute and its continuous expansion – which is inversely proportional to the failure of the governments and the passivity of institutions seduced by gadgets" (Juárez 2016: 186). The critical point, once again, is the hegemonic and commercial background of such closed platforms, products, and services. Although users can suggest additions and improvements, Google ultimately determines what is disseminated through its platform and what is not; respectively, who benefits and how they may do so from their services and products. Critical questions in terms of a digital postcolonialism arise alongside the progress of new technologies: "Unlike in colonial times, in contemporary technocolonialism the important narrative is not the supremacy of a specific human culture. […] the goal is to have the best technologies to turn it into data, rank it, produce content from it and create experiences that can be monetized" (Juárez 2016: 184). A strong case could be made for arguing that copies of the artefacts should be displayed in Western museums, and with the advantage of new technologies in postcolonial times, and that the originals could be given back to the states to which they belong – as has been repeatedly discussed in the press lately and discussed in academic and cultural contexts. The American-Iraqi Artist Michael Rakowitz uses decolonial strategies by including copies of artefacts in dominant value and trading systems. In his ongoing project, *The Invisible Enemy Should*

FIG.3

08 For further information about the term *googlified* and the effect of *googlization* see *The Googlization of Everything* (2011) by Siva Vaidhyanathan.

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● FIG.3 ▶ Map of Google Art and Culture, 2017.

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Not Exist (since 2006), he makes replicas of plundered, damaged, or stolen objects from the National Museum in Baghdad. His true-to-scale reproductions are made of papier-mâché and are covered with Arabic newspapers and packaging from Middle Eastern food sold in the US. His replicas are treated as contemporary art and exhibited in commercial galleries. The British Museum acquired some of his sculptures and displayed them alongside the original artefacts in the Mesopotamia collection. As a result, they have been integrated into the art market and might, potentially, come into the possession of collectors and institutions. Rakowitz's work can be seen as an approach to how digital IT hegemonies, like Google Art & culture, can be subverted. With Google Art & Culture, Google is pursuing its strategy of cultural imperialism with inequalities and divides in digital cultures. It seems more appropriate for such initiatives to be developed by locals, bearing this in mind and with the awareness of a still Western-dominated postcolonial hegemony. These provocative statements raise questions about new forms of a digital and cultural memory. It deconstructs colonial thinking and demands a critical examination of the ongoing impact of the West through colonial thought patterns, knowledge, and representations.

WHO BUILDS A 'NEW PALMYRA'?

Why have I chosen Palmyra? I explored heritage sites in the Middle East, specifically in Syria, by using mapping strategies during a research fellowship at Winchester School of Art, University of Southampton. The research was set up along the tension of an institutionalized memory (top-down) and an emerging digital cultural memory (bottom-up). The resulting project "*A journey to Palmyra*" is a contribution to the formation of a digital memory and claims that bottom-up strategies may well be equivalent to the traditional top-down approach.

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In 2015, Islamic State (ISIS) occupied Palmyra, seized it as its own property, and used it for its propaganda purposes. This came as a shock, since the heritage site had been considered secure in some Western opinions; it was a vision that could not disappear and it 'belonged' to European history. It was inconceivable that it could be overrun. There were fears that it would be looted, damaged, and destroyed after the occupation, as had already happened to other such sites in the North-East of Syria and the West of Iraq, the Mosul Museum in particular, the second biggest Museum in Iraq after the National Museum in Baghdad. By then, Syria had been partitioned into three main regions controlled by the Regime of Bashar al-Assad, the Syrian Rebels, and ISIS respectively. ISIS propaganda had become one of the most powerful vectors, through the public staging of their crimes. They posted a video on the Internet blowing up the temple of Bel and the temple of Baalschamin, the Tetrapylon, and the triumphal arch. The footage went viral; the medial effect was tremendous. The cultural site's destruction triggered a viral iconoclasm "in fact, even though strictly forbidden to display images, ISIS uses all the technical means of image production and distribution in the mass media, especially on the internet" (see Bredekamp 2016: 27, translated by the author). Palmyra was already a well-known site prior to the war. The ancient city became known all around the world after ISIS used it to stage its crimes and abused it for its media propaganda. The destruction and looting of cultural property by terror organizations, as an act of annihilating and rebuilding history, had a huge impact. There have been similar acts against universities and institutions associated with knowledge, diversity, and culture (see Turku 2017).

The Syrian regime have reclaimed Palmyra and have held it since 2017. Due to the site's considerable symbolic value, most experts worldwide agree about the necessity for reconstruction (although replacement is a fundamental issue that splits into for-and-against debates).

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The site has been secured, with international support, and parts of it have been reconstructed. One of the efforts is the *Palmyra-GIS* project by *Deutsches Archäologisches Institut* (DAI). The archive works with open-source data and forms the basis for planning and reconstruction work, as well as the collaboration of international experts. Furthermore, there are many bottom-up projects like the *New Palmyra Project* – initiated by Syrian-Palestinian activist Bassel Khartabil (1981-2015), who was later murdered by the Syrian regime – a platform to collect and archive open data on Palmyra, especially 3D models. An interesting project is the 3D model of the destroyed Temple of Bel, which was reconstructed by using tourist imagery collected on the Internet, mostly from flickr.com (see Wahbeh/Nebiker/Fangi 2016). The damage of cultural heritage in the Middle East and the controversy over its reconstruction brings up two issues: 1) it shows how new technologies and mapping strategies are emerging to create new forms of cultural memories and 2) it also shows how initiatives have been changed to become collective movements and bottom-up maps (in terms of democratizing forms of information production and open access). ○

FIG.4

The occupation of Palmyra – along with the destruction of other cultural properties in the Middle East – is an example of how media, especially the Internet, influence political and religious conflicts and how fundamental ideas are dictated as such. A phenomenon that occurs through new technologies is that artefacts, "having been physically annihilated […] are regenerated through their own images which, once injected onto the networks and hyperlinked to other images, times, and spaces, grant to their destroyed selves an endless, networked after-life" (Della Ratta 2015). The ancient city of Palmyra can no longer be visited because of the ongoing conflict in Syria. It has become inaccessible, as a result of devastation, looting, and its exploitation for propaganda uses.

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However, the war-torn country is travelable on the Internet, even though it is unreachable in the real world. Its infrastructure is visible, even though most is damaged. On the Internet, Palmyra remains a touristic spot and has an odd parallel existence; it is possible to plan a trip to Palmyra through Google Maps or any another free map service. Consulting the Internet on 21 March 2018, location-based services suggested traveling from Basel, Switzerland to Tadmur (Arabian for Palmyra) with a drone (HERE map: distance 2,869 km), a hot-air balloon (HERE map: distance 2,894 km) or by car (Google Maps: 40:44 hrs., low traffic). There are hotel recommendations close to the site and a list of restaurants and things to do nearby – although the closest bar on Google Maps is located in Austria. ○ FIG.5

Users can travel with Google Map to Palmyra and explore geo-located data about its cultural heritage through the Web project *A Journey to Palmyra* (www.palmyra.ixdm.ch). The interactive map shows what remains of Palmyra and shows the touristic spot's geographical footprint. The website consists of several layers, or rather realities (including location-based services from Google Maps, private tourist photos from Flickr, real-time information from Reuters, and Twitter or information from Interpol and UNESCO). For Palmyra, the map becomes a visual episteme of a digitally constructed world – to a site which no longer exists. Thus, it emphasizes the parallel lives and inner logic inherent in digital cultures. ○ FIG.6

On the Internet, Palmyra is an unregulated space – having both a glorious past and as being a place of horror – with its own after-life (digital traces and data on the Internet). Palmyra's spatial, digital footprints shown on Google Map are mostly unsorted, uncommented upon, and unregulated.

Working with Google Maps was useful because it is one of the most used maps. The map includes geographic information that has been volunteered, like reviews, photos, placemarks,

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● FIG.4 ▶ "Before and after"; the destruction of the ancient city of Palmyra, a UNESCO world heritage site located in the desert of Homs.

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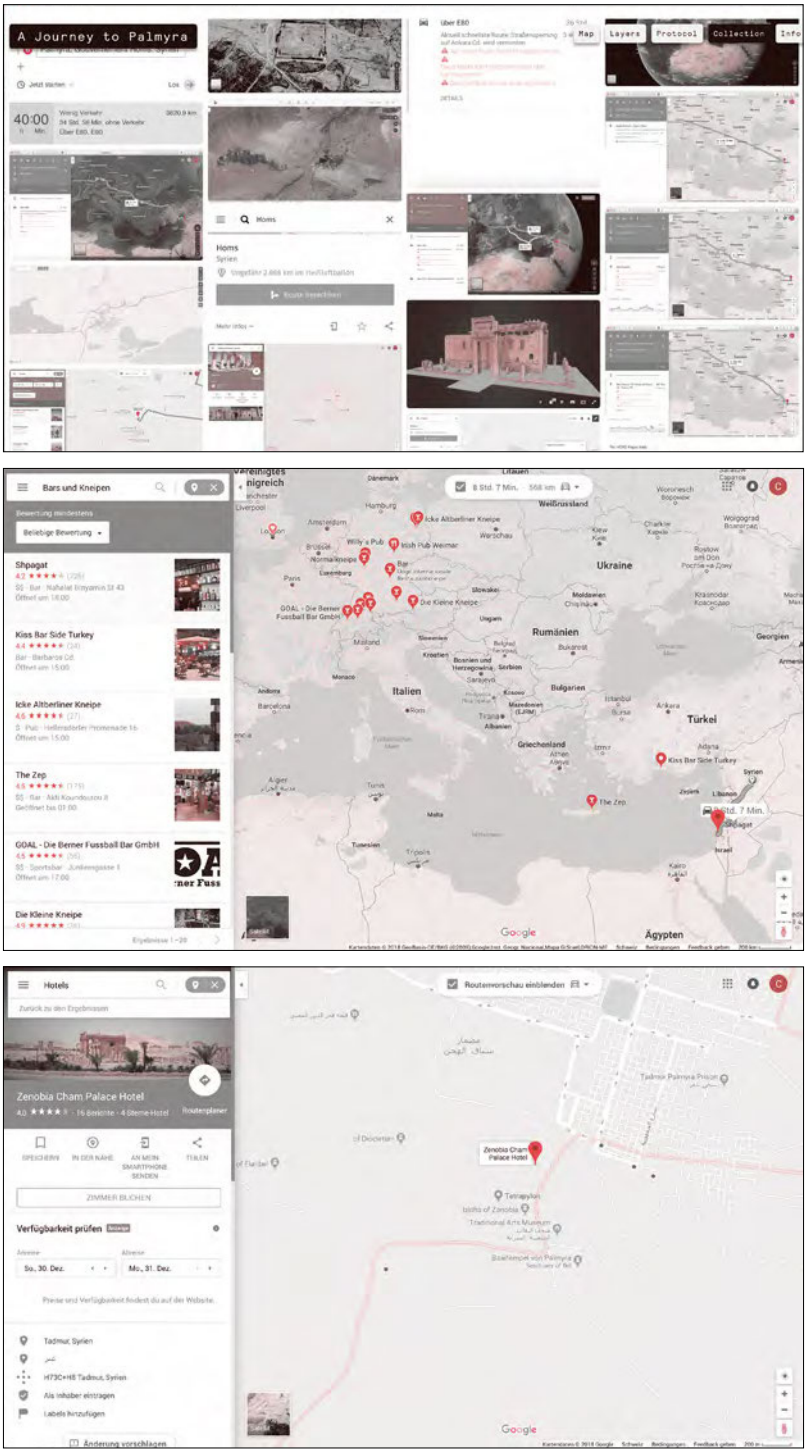

● FIG.5 ▶ Maps and route planning to Palmyra with various online tools, available on the Collection of the Web project.

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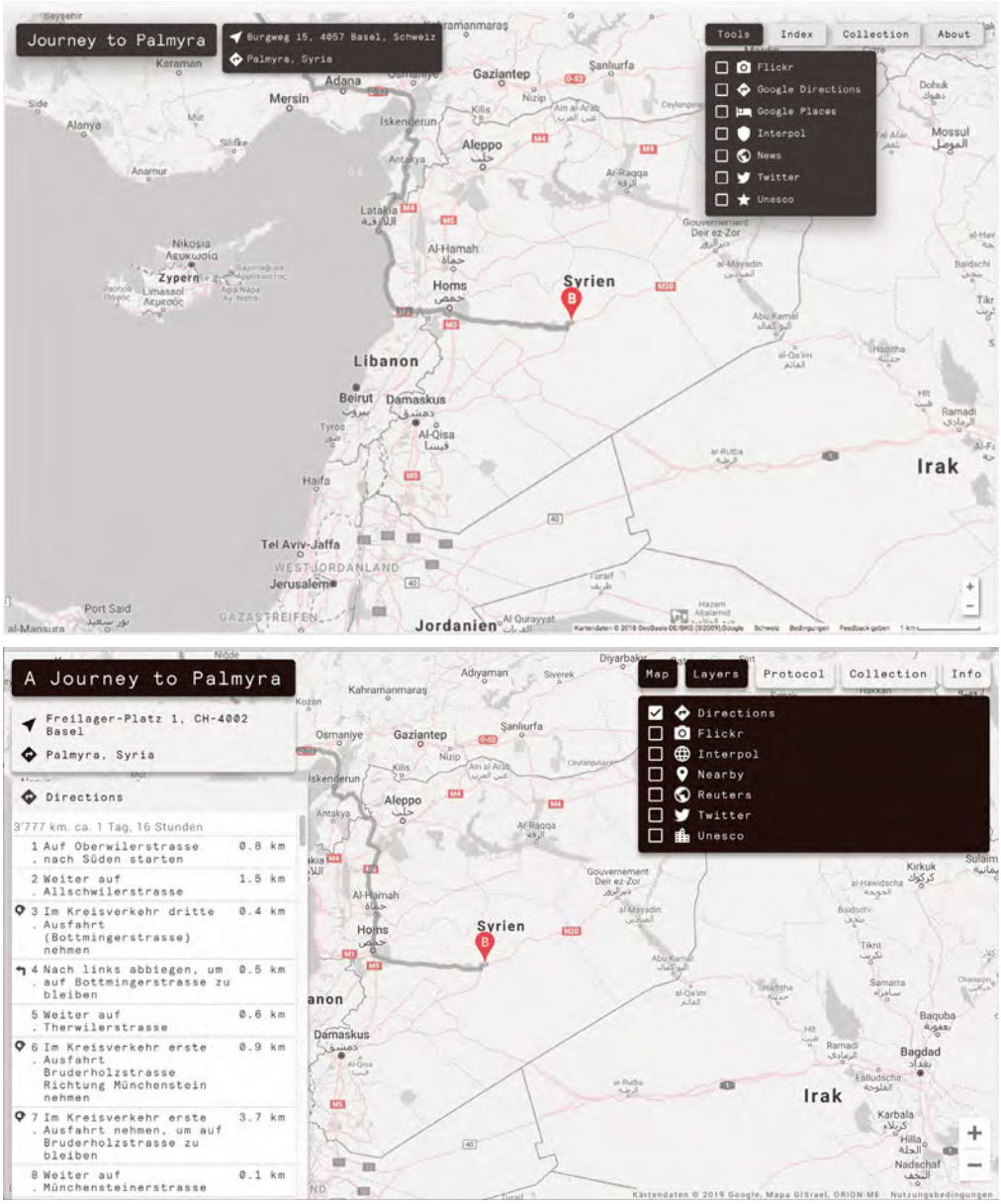

● FIG.6 ▶ Christine Schranz: *A Journey to Palmyra* [2018].

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etc. Platforms like Google shape the digital world around us and this influences our perception thereof. Google ultimately decides how the world looks and is perceived in the digital through the mass distribution of its products, services, and APIs. This hegemony creates a frightening potential for a (new) digital imperialism. Despite the projects questioning our everyday use of Google Maps and their claim to objectivity, Google Maps remain firmly embedded in our everyday lives. We use its services every day to find a location, route, or restaurant and to navigate to our destination with the aid of a technological device. Google suggests a world in which we are free in the selection and production of information, but how can we actually be certain that the information is objective or even correct? This addresses a further question about ownership and the ethical state of maps: who owns and maintains this data?

CONCLUSION

This article has reflected upon how bottom-up movements and mapping strategies in a digital society may affect the cultural memory of destroyed artworks and heritage, mainly in the Middle East and along the lines of cartographical thinking. The examples discussed all deal with advances in new technologies, open data, and aspects of decolonialization. It was intended to show how bottom-up strategies may be a new way to collect, reconstruct, and to preserve cultural heritage. I have argued that bottom-up mapping strategies may be a new approach against hegemony and institutional power. However, it has also been shown that new topoi emerge alongside a digital shift. These topoi include, for example, new dependencies and abuses of power, given that the algorithms on which this new worldview are based are not open, by and large. A new imbalance of power and new ruling elites have arisen within

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digital cultures (the US-American computer scientist and artist Jaron Lanier calls these dominant Western companies the *Big Five*[9]: Google, Apple, Microsoft, Amazon, und Facebook (Lanier 2013). This has consequences for new topoi and the exclusion of digitally produced knowledge: not everyone has access to the Internet, and even where they do, that access and the knowledge made available are controlled and restricted by the big internet companies, since there are rarely other alternatives. With this in mind, there are three main concerns that are still crucially pertinent: firstly, data and corresponding algorithms are not open; secondly, the distribution and use of the data is dictated by companies; thirdly, this results in a new form of data colonialism with new concerns in terms of the democratization of data.

Furthermore, I have reflected upon the implications for a decolonizing of data politics and the emergence of a digital cultural memory in digital times through new technologies. Bottom-up strategies are becoming more and more powerful and important with big data and social media. Within digital culture, questions have arisen about the aura of digitalization, its immortality, and what value a digital reproduction should have. Open access and bottom-up strategies can be seen as giving rise to cultural empowerment in the face of those conventional strategies dictated by governments and institutions. This leads to three key conclusions: First, all world knowledge about Palmyra can be gathered, collected, and be used to rebuild Palmyra through georeferencing and localization on a map interface. To that end, the map becomes a visual episteme and an initial point for a digitally constructed world heritage which has been destroyed. Such a map could exist in either a physical or digital en-

9 In China, comparatively unknown services like Baidu, Tencent, or Alibaba are the market leaders, given that services are limited or can be used only to a limited extent due to the large Chinese firewall.

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vironment. Second, by combining open map projects (data from spatial points) with 3D models (data from static objects), spatial reconstruction might become a bottom-up activity by initiatives like ASOR or the Million Image Database. The map can serve as a planning tool, both on the large-scale plane of the map, and on the small-scale plane of the object. Third, it is important to provide technological infrastructures, not only to support the reconstruction of the endangered cultural artifacts, but also to support methods of decolonization, shifting the discussion from whether (and where) individuals have access to digital technology.

The approaches discussed, particularly the bottom-up and decolonializing strategies, are understood as an alternative against a top-down hegemonic Western approach.

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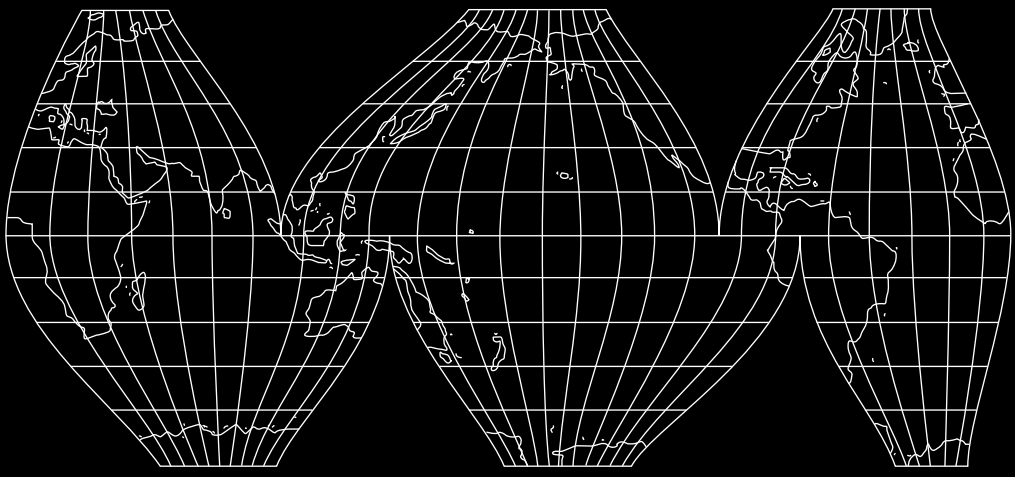
(HOW) CAN DATA IMAGES BE CRITICAL?



Birgit Schneider

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Some ideas on the construction of people and unconventional graphs throughout the history of data graphics

Today, data images are omnipresent. Data journalists have been producing impressive, colorful graphics and maps for several years now. The "New York Times" and the "Guardian", among many other newspapers, regularly produce full-page diagrams and maps that visualize topics as diverse as geopolitics, urban development, or the spread of disease. Moreover, data images are also ubiquitous in numerous research areas and in the area of politics. My chapter's central question is: to what extent can data images and data maps themselves be critical and exceed their positivistic logic? Following Michel Foucault's idea of critique, I see at least three different points of entry for criticism besides the possibility to criticize the charts themselves: either the data behind the graph is critical because it challenges power; or the procedure of data acquisition is a critical act because it challenges institutional forms of data collection; or, finally, the form and design of the data visualization

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itself is critical by subverting graphical norms. I will unfold the argument by choosing historical diagrams that address groups of people through racial categories in very different ways. Examples are charts and graphs by Otto Neurath, from a German biology schoolbook from the Nazi period and by W.E.B. Du Bois to interrogate different entry points of critique. The overarching theme is the synopticism of data images in general and their calculative rationality, which statistical images and charts cannot leave behind. I will argue this by taking ideas from critical cartography, but also by moving beyond that discipline.

"TRUST IN NUMBERS"

Pointing to a graph of numbers has become the modern way to claim interpretive authority. Theodor Porter, a historian, referred to this relationship, which first became established in the 19th century, as "trust in numbers." Since then, mathematics and statistics – the discipline that concerns the collection, organization, analysis, interpretation, and presentation of data – rose not only as a source of new knowledge, but also as a strategy to claim scientific authority and objectivity. This led to "prestige and power of quantitative methods in the modern world" (Porter 1995: VII). Rigorous quantification has been sharpened into a method of super-personal objectivity, particularly in the justification of decisions made within a political and administrative environment that grants it a super-personal authority. Following this concept, we can say: many stats are *decision making tools* – statistics, data images, and data maps are among the most important tools of governance.

With the beginning of the Corona crisis everybody has been able to follow this on a daily basis. It was the reference to numbers and curves and the cry to "*Flatten the curve!*" that justified authoritative regulations and behavioral changes. At the same time, everyone got dizzy considering the numbers we stare at every day: Case numbers, R-values, growth rates, death rates with and from Corona, number of tests, positive tests, recovered and

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currently ill people, or the 7-day incidence report. There have been repeated changes in terms of which figures have been communicated in the news over the months. Numbers were often communicated without comparisons or comparisons were given that were not actually comparable. In terms of ratios, there is also the question of what factors were and are being related: Country comparisons, R-values, and intensive care bed utilization, or corona and influenza infections? The effectiveness of politics depends on the "trust in numbers".

In a world with risks, societies have developed different ways to make risks controllable and governable. The sociologist of risk Ulrich Beck has emphasized the special value that representations have for correctly assessing risks, and in taking decisions: "For it is only through the representation, the enactment of the world risk that the future of the catastrophe becomes present – often with the aim of averting it by influencing present decisions" (2008: 30, translated by BS). Without such tools, policymakers would be blind to eventual futures.

After these general remarks about statistical maps and graphs and political power, I want to set out some thoughts about the critical potential of data visualizations. My thoughts have been initiated by increasing and fascinating publications in the field of what today is called *data journalism* and my post-structural reading of data visualizations, which has led to the insight that statistical rules and their graphical structures cannot ultimately escape positivistic methods and patterns.

"WHAT IS CRITIQUE?"

There are criteria for critical practice that allow for the erection of a distinction between critique and merely criticizing or badmouthing something. Moreover, one can ask who actually is or may be the voice of critique in societies.

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In democracies, there are special professions that engage in criticism. The most prominent include journalists as the fourth force. It is they who have an essential control function against the powerful.

Quality standards for journalists apply equally to data journalists: the demand for free, independent, and critical reporting; these principles contain the inclusion of up-to-date or background information, explanation, classification, but also the ideal of accuracy in the sense of being true to the facts. This goes along with values such as completeness and transparency, but also first-hand information. The presentation of reports should be understandable; journalists have to master the art of simplification without distortion. For data journalists, the scientific quality criteria of cartography and statistics are added, which are accuracy of data and presentation, comparability and coherence, accessibility and clarity, timeliness, and expressiveness (Card 2003: 523).

So, what does the word critical mean in the term "critical reporting"? Michel Foucault gave a lecture to the French Society of Philosophy in 1978 entitled: *What is critique?* Here, Foucault emphasized criticism as a practice in the sense of a certain attitude, which he called "virtue", a moral and political attitude, referring to the epoch of enlightenment in the 18th century. *Sapere aude!* – dare to know! – was the motto of this attitude which credited every human being with the ability to leave immaturity behind: "A certain way of thinking, speaking and acting, a certain relationship to what exists, to what one knows, to what one does, a relationship to society, to culture and also a relationship to others that we could call, let's say, the critical attitude." (Foucault 1997: 24) ○ FIG.1

Moreover, criticism is always related to something, a circumstance, certain events or institutions, or even to a policy. This means that critique always has a vector and point of reference. Without this frame of reference, there is no critique. Critique is always an antagonist, a

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counterpart to authorities; "critique only exists in relation to something other than itself: it is an instrument, a means for a future or a truth that it will not know nor happen to be, it oversees a domain it would want to police and is unable to regulate" (ibid: 25). Foucault's key question for the critical practice is, "how not to be governed like that, by that, in the name of those principles, with such and such an objective in mind and by means of such procedures, not like that, not for that, not by them" (ibid: 28). This statement is a call for a general questioning of official structures, their hierarchies, and their rules.

What we gain from my question about the critical potential of data graphics from the critical attitude and its determination by Foucault is the triangle of relations in which Foucault locates the critical attitude. We can use this with respect to the question of data images with the claim of criticism and elucidation, by stating that, "critique is the movement by which the subject gives himself [and herself, BS] the right to question truth on its effects of power and question power on its discourses of truth" (ibid: 32).

I want to summarize Judith Butler's take on Foucault's interpretation of critique where she related Foucault's idea of critique even more to aesthetic forms of truth in her talk that became published in 2002. Part of the critical enterprise, Butler writes, is a particular way of asking questions that will prove central to the accomplishment of critique (2002: 2). Giving a basis for normative judgments, normative claims, it is first necessary to ask about the values that prepare the action, and this will be an important dimension for any critical study of normative issues. Criticism is not useful for evaluating whether social conditions, etc., are good or bad, highly valued, or lowly valued; instead, criticism is intended to elaborate the system of evaluation itself. Butler poses the following questions, which I will quote in detail because they can be posed to graphs directly:

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"What is the relation of knowledge to power such that our epistemological certainties turn out to support a way of structuring the world that forecloses alternative possibilities of ordering?" (ibid: 4). "To what extent, however, is that certainty orchestrated by forms of knowledge precisely in order to foreclose the possibility of thinking otherwise?" (ibid: 4). The following questions apply to the classifications chosen in statistics especially: "What counts as a person? What counts as a coherent gender? What qualifies as a citizen? Whose world is legitimated as real?" (ibid, 12). "Who can I become in such a world where the meanings and limits of the subject are set out in advance for me? By what norms am I constrained as I begin to ask what I may become? And what happens when I begin to become that for which there is no place within the given regime of truth?" (ibid: 12).

So, the general question is, which power relations limit a priori what is to be considered truth and what is not. I want to apply "the question of the limits of our most sure ways of knowing" (ibid: 5), as Butler wrote, to the 'iron language' and presentation of statistical data graphs and maps, because there are different media for criticism. But how can data maps and graphs become a medium of critique? Or can maps only be the object of criticism?

How do these two epistemic forms, the quest for critique, and the quest for data insight respectively, come together in contemporary investigative data journalism? I would like to illustrate this question with a well-known historical example. ○ We can ask: is the famous map of Napoleon's campaign against Russia by Charles Joseph Minard, which he created 57 years after the event, a critique of the meaningless sacrifices of war? If so, where exactly does this criticism originate? Was it in the collection of the data (Minard wasn't a whistle blower, instead he applied official data that had already been published), in the choice and framing of the topic, in the procedures of how this

FIG.2

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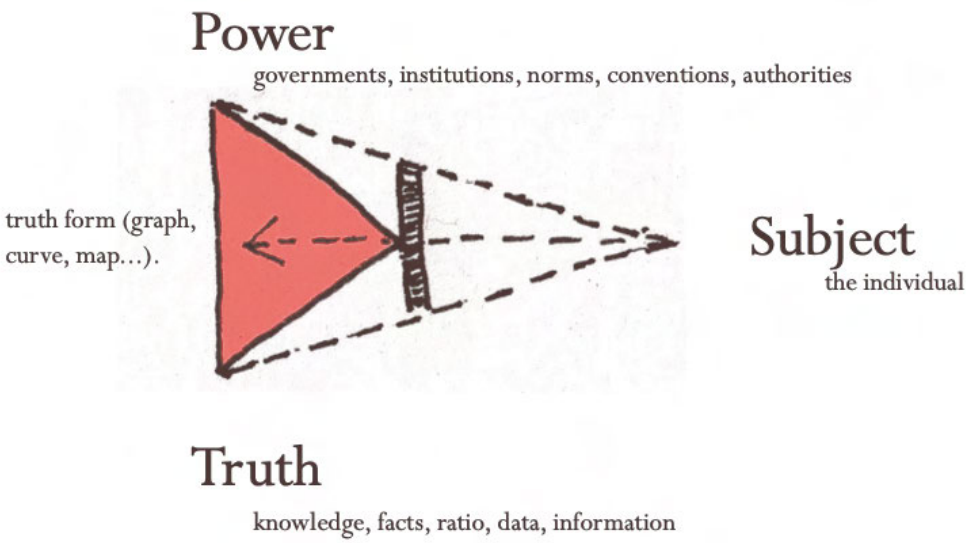

● FIG.1 ▶ "Triangle of critique: a relation of the individual towards power and truth." Graphic: Birgit Schneider.

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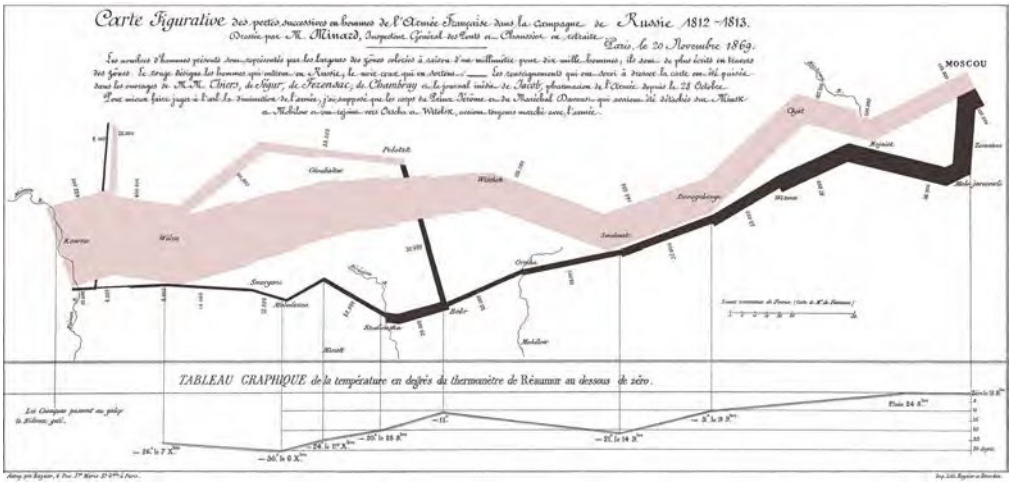
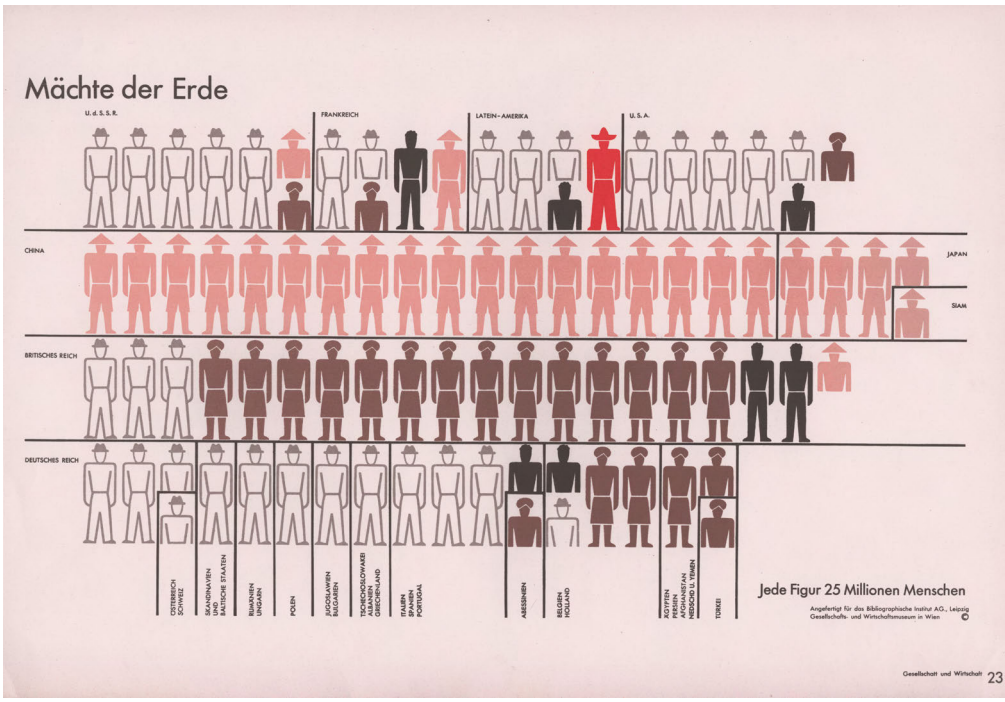


● FIG.2 ▶ "The art of not being so governed"? Charles Joseph Minard's map of Napoleon's campaign against Russia in 1812, 1869.



● FIG.3 ▶ Powers of the World. Standardization of people by linocut symbols and limited colors in Otto Neurath: Gesellschaft und Wirtschaft. Bildstatistisches Elementarwerk [Society and Economy. Elemental Pictorial-statistical Opus], 1930.

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knowledge is prepared as a statistical data map, or in the unconventional visual presentation form itself, for which the map has become famous? We could ask similar questions for the equally famous charts by William Playfair (Sieber 2022) or of Florence Nightingale's rose diagrams. I see different points of entry for criticism stemming from Michel Foucault's idea of critique and its reading by Judith Butler. These assign to data visualization either the role of an (passive) object of critique (1) or, on the contrary, the role of a critical subject and agent (2-4):

1. We can criticize individual examples of statistical visualizations;
2. The data behind the graph can be critical because the authors publish data that has not been shared publicly and, therefore, it challenges truth and power;
3. A data visualization can be critical because it informs people about a truth that is neglected or has been forgotten about in the current discourse;
4. Finally, the data visualization's form and design can be critical by subverting graphical norms.

In the following section, I will use historical examples to elaborate these different entry points for critique for data visualizations.

WE CAN CRITICIZE INDIVIDUAL EXAMPLES OF STATISTICAL VISUALIZATIONS

Otto Neurath (1882-1945) pursued an objective and scientific ideal in the production and communication of statistics. Charts should communicate facts in a comprehensive and expressive way and enable informed decisions. Furthermore, he was particularly concerned that popular statistics should educate each individual, especially the less privileged workers, about their own situation so that they could advocate for improvements based on this knowledge.

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"I found out that most people are like me – they want to acquire a general knowledge of their environment both in their own country and abroad, but it is only as laymen and not as experts that they wish to do this. Experts can tell us of their results but they cannot make decisions for us, since they are swayed by their own desires and individual outlook. Therefore, whenever the fate of individuals and communities is at stake we need some comprehensive knowledge to help us make our own decisions. It is for this that I think visual aids are so important, especially when we wish to educate ourselves and others in citizenship." (Neurath 2010: 7).

The ideal of the informed citizen was the aim of his pictorial language. In a very general manner, we can criticize every data visualization for not being expressive or correct enough, not meeting the standards of accuracy, just as we can do with singular graphs that depict the corona pandemic, in order to call out for better, more accurate images for example. But there are also other aspects of charts to which criticism can apply. From today's perspective, some of Otto Neurath's statistical graphics can be criticized for their unquestioned clichés of racist symbolic figures, as in the case of the figurative bar chart illustration "Mächte der Welt" (Powers of the World) from the joint work by Neurath and Gerd Arnz "Gesellschaft und Wirtschaft. Bildstatistisches Elementarwerk" (Society and Economy. Elemental Pictorial-statistical Opus) which was published in 1930. ○ **The stylistic decision to reduce all charts to eight colors and to symbolize categories with the simplest possible attributes and icons led to the fact that the societies of the world became seen from a perspective of colonial European history. Moreover, they were all translated into male, human-shaped symbols with only five colors to depict the skin colors of ethnic groups (white, brown, yellow, black, and red) and five different types of traditional outfits and headwear (Asian conical hats, Hom-**

FIG. 3

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burg hat, turban, sombrero). Only the black figures are shown with a bare head and hair structure. In this, the authors staged racial and hierarchical stereotypes and stigmatized people even though their primary intention, as I assume, was not to denigrate through caricatures. However, this was the result of the ideal to be comprehensive by means of pictorial symbolism and in order to avoid abstraction. Would a completely abstract graphic, consisting only of numbers and lines, have erased the racist layer of representation and through their joint efforts simply have dispelled the accusation of racism? Is it true that there are no ideology-free images?

I would like to relate this question, how form and content are mixed in the case of charts and graphs, to a far more problematic example than Neurath's stereotypes of ethnic groups, which comes from the Nazi period and its racist and eugenic construction of "Volk" (a people). It applies the power of objective science, persuasion through facts, classification, and comprehensive overview to the racial doctrine itself in the same graphically elegant and modern style for which Otto Neurath had become so famous. Neurath was a member of the Vienna Circle and was a Marxist. My question is, what changes when visual displays of quantitative or causal information like bar charts, maps, or flowcharts communicate obviously racist contents in a similar form and style? Here I am interested in criticizing the abuse of educational graphics employed in the name of a racist and totalitarian ideology.

Racist and eugenic propaganda was an omnipresent theme in the NSDAP's time. The propagandists aimed at making demands on policy on the basis of biology and racial doctrine ("Erblehre"). We can observe the significant effort to make racial doctrine and law-making common knowledge by using enlightening infographics as a motor to change the minds, morals, and education of the people with the aim of

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producing the "higher ideal" of a pure German so-called "Volkskörper". When the NSDAP came to power, they implemented their doctrines into everyday life very quickly and wherever possible. This also included the school curriculum and education which became monopolized and homogenized, because it appeared promising to the power holders to influence people when they were still young and shapable. This is what one of the campaign's planners wrote:

"Through racial hygienic thinking (including population science in the narrow sense), strong impulses can be awakened in the pupils which contribute to the formation of true German citizens. There is hardly any other area of biology teaching which is so strongly emotional as this, and it would be a gross pedagogical sin of omission if we did not exploit such a value." (cited after Cromm 2004: 304, translated by BS).

Population awareness should be thought of as a population problem by evoking fears of decline, which could only be conquered by "racial hygiene". So, the racial doctrine was systematically integrated into school media and textbook knowledge during the years 1933-1945. The subject that was supposed to teach these connections was natural science. By shifting doctrines to biology, racist thinking became framed as biological thinking and it became formulated like natural law. Historian Jürgen Cromm, in an article on the subject of Nazi-education, wrote that: "The authors present their evidence and conclusions and policy measures as a logical consequence of scientific facts, translated into language appropriate to the age and level of education, from simple, pictorial and illustrated to scientific language" (Cromm 2004: 314, translated by BS). The implementation into society must have been very successful, if we think about the claims of NSU and right-wing values in Germany today. During the National Socialist Underground trial 2013-2018, one member's defense revolved around wanting to invite a demographer to the court to prove the idea of the German people's decline ("Volkstod"). This

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demonstrates the lasting effect of this racist construction of "a people" to this day.

For the infographics presented here, we might ask what categorization – race, class, and gender – are the guiding principles for structuring the data for the purposes of teaching biology in a German secondary school during the Nazi government. ○ The graphic design of the numbers is cold, modern, and factual. They represent a reworking of an earlier publication by Alfred Vogel (Vogel 1938). ○ I assume that the original author of the graphs, Alfred Vogel, was aware of the new statistical approach taken by Marxist Otto Neurath, and his ideas for popular education through information pictures, and Vogel just applied this approach to educating the masses in racist Nazi values in a cruel and pseudo-scientific logic. ○ The neutral, aesthetically pleasing, and objective design of tables, bar charts, and flowcharts are used to educate German pupils about the need for German citizens to bring as many healthy children into the world as they can and informs them about who to reproduce with.

FIG.4

FIG.5A

FIG.5B

Some graphics combine the neutral design of bar charts or reproduction diagrams with caricature-like cliches of "the Jew" or figuratively stylized icons of the highly reproductive German family – living in a traditional house in the countryside. A father of four kids is holding a spade like a farmer to plant his seed into his ground; his wife is wearing a traditional dress with the obligatory apron. Here we can of course very easily criticize the normative cliché of the German family and the degrading picture of the Jew. However, I would argue that such statistics would be problematic even if they had refrained from using racist or normative and misogynist icons, although such figures emphasize the racist dimension of the charts even more explicitly.

We can learn from such an example that even though the content changes drastically, the aesthetic does not have to. Such examples of discriminating and normative social statistic discuss race doctrines in terms of natural

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sciences. They use the rational logic of chart design to construct their notion of a people. By publishing the charts in a biology textbook, they are framed as truth to reason and rationality.

This allows us to discuss the ideology behind seemingly neutral charts and data images. The critical take here would be similar to the widespread view about the use of tools as weapons: A knife in itself may be a neutral tool, but using it to kill or hurt someone transforms the tool into a dangerous weapon. Is a graph a neutral tool? This would mean that a graphical form, like a bar chart, can be seen as being like a museum that can be filled with different content, like an empty and neutral structure. As a consequence, we need to criticize the content only, but not the form or package of its delivery. We could compare a graphical form to language in a similar way. The alphabet, words, and syntax can be seen to be the medium to transport very different ideologies. Language is neutral to content, albeit only up to a certain point. Then again, certain terms are bound to contexts and histories of exploitation, injustice, and discrimination; therefore, they are not neutral at all. There is no truth claim without context, this is why it is so important to situate knowledge. At the same time, statistics are a language with a quasi-natural truth claim resting on rationality. If we could not read the words, which of the graphs mentioned would still be racist? In their neutral design, they can blend out ideological and moral framings and instead deliver them as quasi-natural laws.

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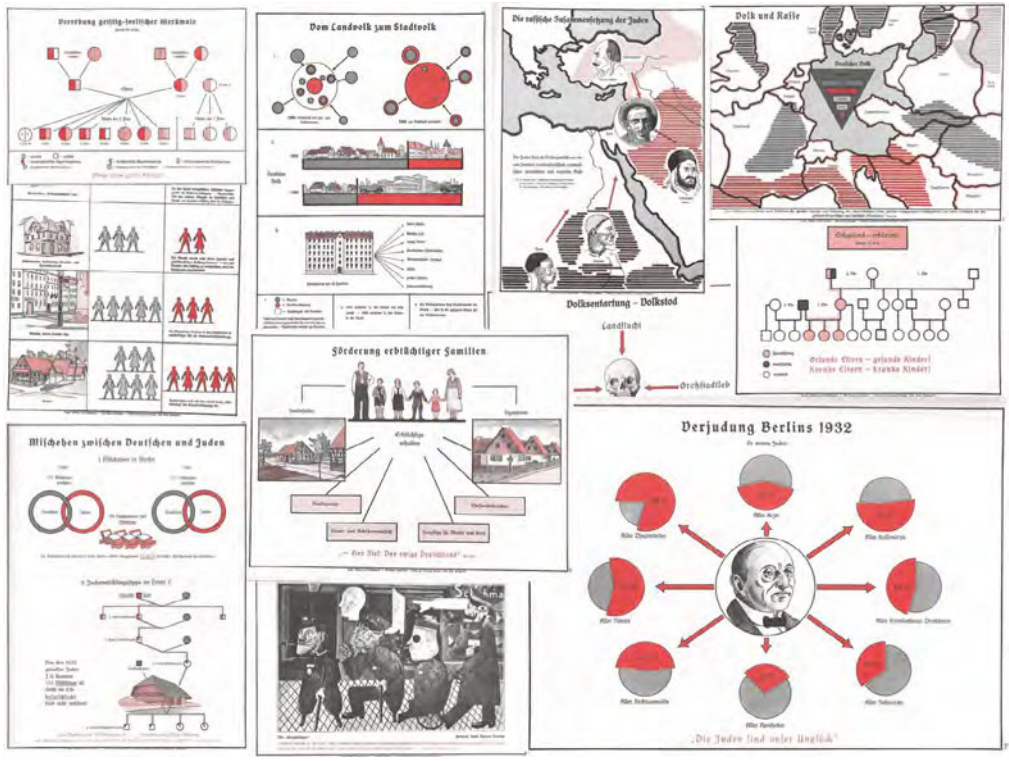

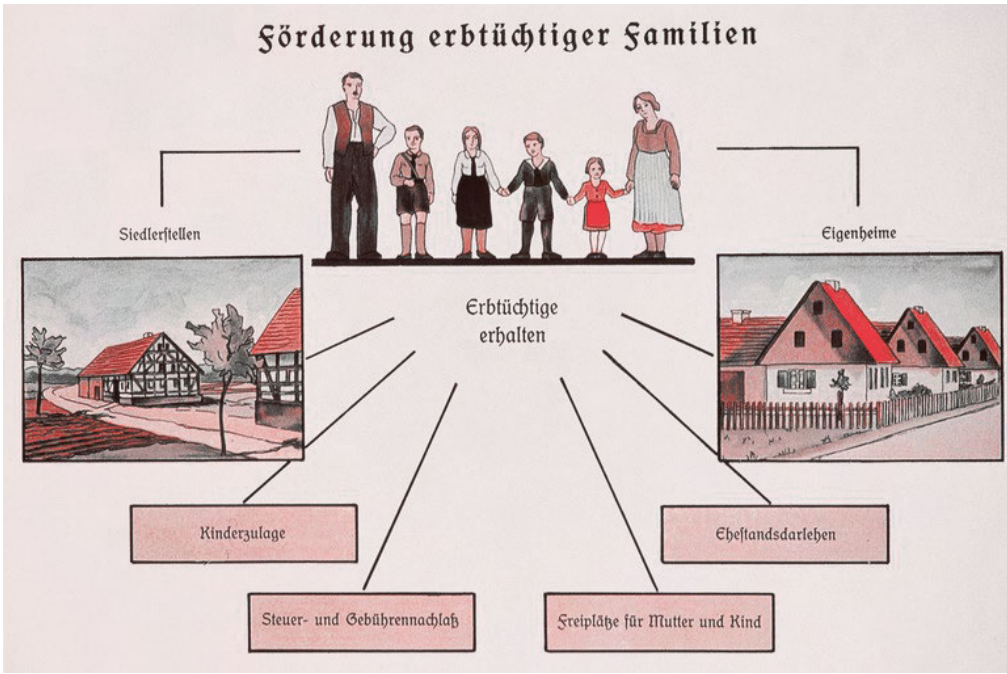

● FIG.4 ▶ Alfred Vogel: Erblehre und Rassenkunde in bildlicher Darstellung [Genetics and racial science in pictorial representation], 1938.

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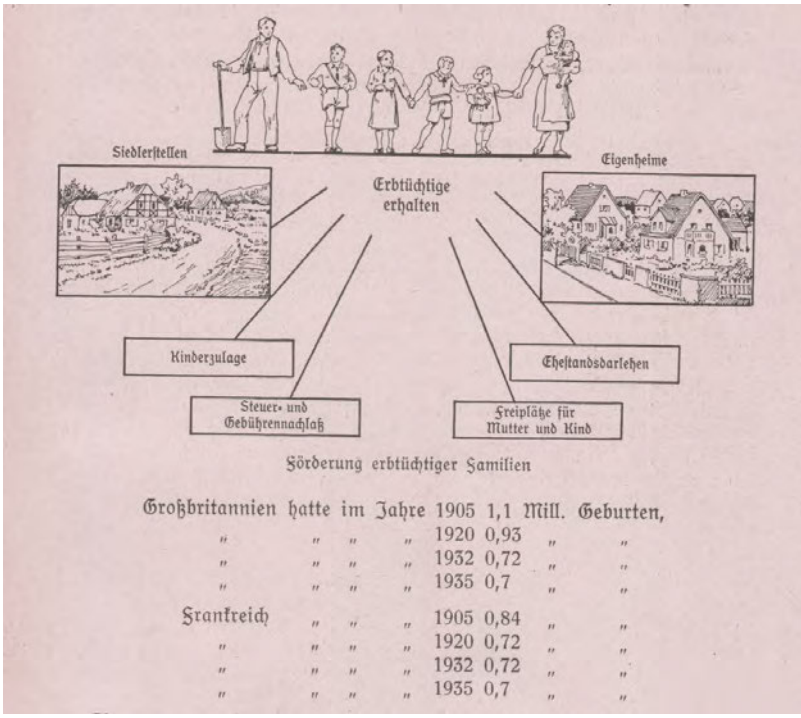

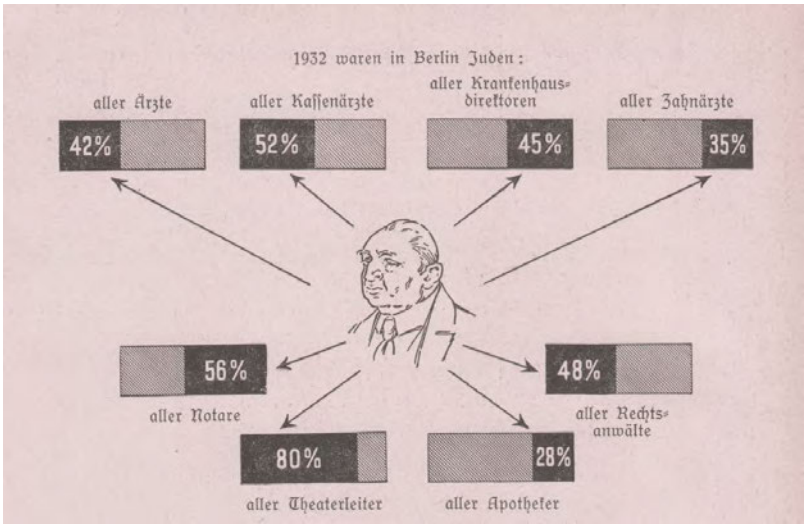

● FIG.5A/B ▶ Charts of racial doctrine for German biology classes after Alfred Vogel [fig. 4]. Meyer-Zimmermann: Lebenskunde, Bd. 3, Lehrbuch der Biologie für höhere Schulen [Textbook of biology for secondary schools] Erfurt 1942, 3. Aufl.

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CRITICAL PRACTICE OF CHART DESIGN

I have chosen the following example to discuss the other forms of criticism mentioned, which anchor criticism in the data design practice itself (2, 3, and 4). Data acquisition can be a critical, counter-cultural act because it challenges institutional forms of data collection and authority knowledge by telling stories with numbers. This is the *sapere aude!* part of statistics.

Famous examples were once again initiated by Otto Neurath, who believed that informing the working class about their own status quo would empower them to change their situation, but we can also return to the invention of Florence Nightingale's rose diagrams from the 19th century, which she used to convince rulers to improve the hygienic standards in hospitals (Brasseur 2005). The ideal of data collection here goes hand in hand with the belief that you need to know about the context, and you need to analyze the problem in order to ground political claims. As a consequence, people require comprehensible maps and graphics that support their knowledge and communicate it evidently and clearly to a diverse public.

To problematize these positive ideas about the usefulness of data designs, I would like to turn to the graphics of a Black professor of sociology at Atlanta University some decades before Otto Neurath published his Isotype ideal (Battle-Baptiste/Rusert 2018). William Edward Burghardt "W. E. B." Du Bois (1886-1963) was a sociologist and author from Massachusetts, who later became an activist and a Pan-Africanist. He had studied at Fisk University, Kaiser-Wilhelm-University in Berlin (now Humboldt University), and Harvard at which he was the first African American to earn a doctorate. In 1897, he became a professor of history, sociology, and economics at Atlanta University. Two years later he published his first major academic work entitled "The Philadelphia Negro[1]" (1899), a detailed and comprehensive economic

01 "Negro" was the term used by Du Bois. It will appear in this paper only when quoting his work.

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and sociological study of the African-American inhabitants of Philadelphia.[2]

Du Bois used statistical design in the three critical ways. He collected new data (2) and by this informed about their life but also made visible the high share of Black inhabitants to economy and U.S. progress (3). Du Bois and his team overcame the fact that Black persons were not even included in the statistics until then, or if they were, they were listed according to criteria that he considered unrepresentative. The chart's aesthetic was uncommon and pioneeringly protomodernist (4).

Rhetorician Lynda Olman has written that Du Bois actually "decolonized the infographics" (Olman, in press). His aim was the "reformation of white viewers' thinking around Blackness and race, and uplift of Black viewers' self-conception" (ibid). Du Bois' motivation to make these graphics was to educate and inform by offering factual information nearly three decades after the Emancipation Proclamation: "The Negro problem was in my mind a matter of systematic investigation and intelligent understanding. The world was thinking wrong about race, because it did not know. The ultimate evil was stupidity. The cure for it was knowledge based on scientific investigation." (Du Bois cited after ibid) In the following paragraphs, I will intensively draw from Olman's analysis and on the publication of the charts by Whitney Battle-Baptiste and Britt Rusert.

Du Bois had a very limited budget, both in terms of time and money, for the process of data collection. Within less than half a year, his student team had brought together existing census data, but also supplemented the data with specially conducted surveys in Georgia (Battle-Baptiste/Rusert 2018: 17). The graphics were divided into two larger and a smaller intermediary section: "The Georgia Negro: A Social Study", "A Series of Statistical Charts

02 It showcased Black progress in ten different categories: history; education; literacy; occupations; property; publications; patents; industry; cultural organizations; and race relations in the U.S.

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Illustrating the Condition of the Descendants of Former African Slaves Now Resident in the United States of America", and "Income and Expenditure of 150 Negro Families in Atlanta, GA, USA." The graphics were produced for the 1900 World's fair in Paris, where they were exhibited in a special section entitled "The Exhibit of American Negroes". They were shown together with several series of photographs depicting African Americans, their institutions, and patents within the U.S section in the Palace of Social Economy, in the style of a modern multimedia cabinet. The exhibition toured through different U.S. cities afterwards.

Du Bois' data graphics stand out for both their content and their unusual protomodern aesthetic, which may have been additionally increased by the purpose of the exhibition. The graphics and maps were hand-drawn in ink and watercolor. One of the most uncommon figures is a colorful spiral "where he folds the parallel lines of the bar graph into a continuous zig-zag and spiraling path that frustrates the process of visual comparison while amplifying the aesthetic aspects of the graph as well as a sense of disorientation", as Olman writes (ibid). Many of the graphs only reveal their structural meaning at a second glance, but they draw attention to their significant form immediately.

His strongest influence at the levels of content, style, and color was Francis A. Walker's 1870 "Statistical Atlas of the United States" (ibid). However, although this was the most comprehensive volume on the subject of social statistics, there was only a little that could be learned about the specific life of Black Americans, except about general shares in the population of the various States. Another model for the design of Du Bois' charts might have been Charles Whittingham's popular illustrated version of "The first six books of elements by Euclid" (1847) which made extensive use of the primary color palette of yellow, red, blue, and black for geometric laws of form, long before De Stijl. ○○

FIG.6,7

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I will not go into the history any further at this point, but will instead discuss the example in relation to my central question. We could conclude that Du Bois successfully applied data graphics in a critical way. Both the production and publication of the charts was an act of protest. He staged the marginalized who had been neglected by the powerful, he collected new data, and he reconfigured data for new questions; he even presented his findings in an uncommon design. So, we can assume the project was "a powerful counter-argument, stating that blacks had always been a part of world history and that 'black spirit' was evident in the range of culture on view – from literature and poetry to patents and other works of independent black genius", as Whitney Battle-Baptiste and Britt Rusert wrote in their re-editing of the series in 2018 (Battle-Baptiste/Rusert 2018: 43). However, even after the very well-received exhibition Du Bois came to the insight that, "one could not be a calm, cool, and detached scientist while Negroes were lynched, murdered and starved." (Du Bois cited after Olman) Du Bois considered his project to be a failure, because the scientific language was not adequate either to the subject or to his political objective. There was no time to inform about the conditions if the rulers did not want to listen, but maybe it was also not about making Black people visible within seemingly neutral abstract graphs, while obviously concrete Black people were being killed; there was also another, more subliminal reason for the failure within the graphic method itself which likewise had to do with ruling hegemony and which resides in the objectifying Cartesian tradition of what Max Weber termed "occidental rationalism" or Eze more recently named "calculative rationality" (Eze 2008: 25). Olman highlights the panopticism of the charts:

"Infographics are tough to decolonize, however, because their very *raison d'être* is panopticism – i.e., presenting a complex situation or problem as a simpler one that can be comprehended "at a glance" (Barton & Barton, 1993).

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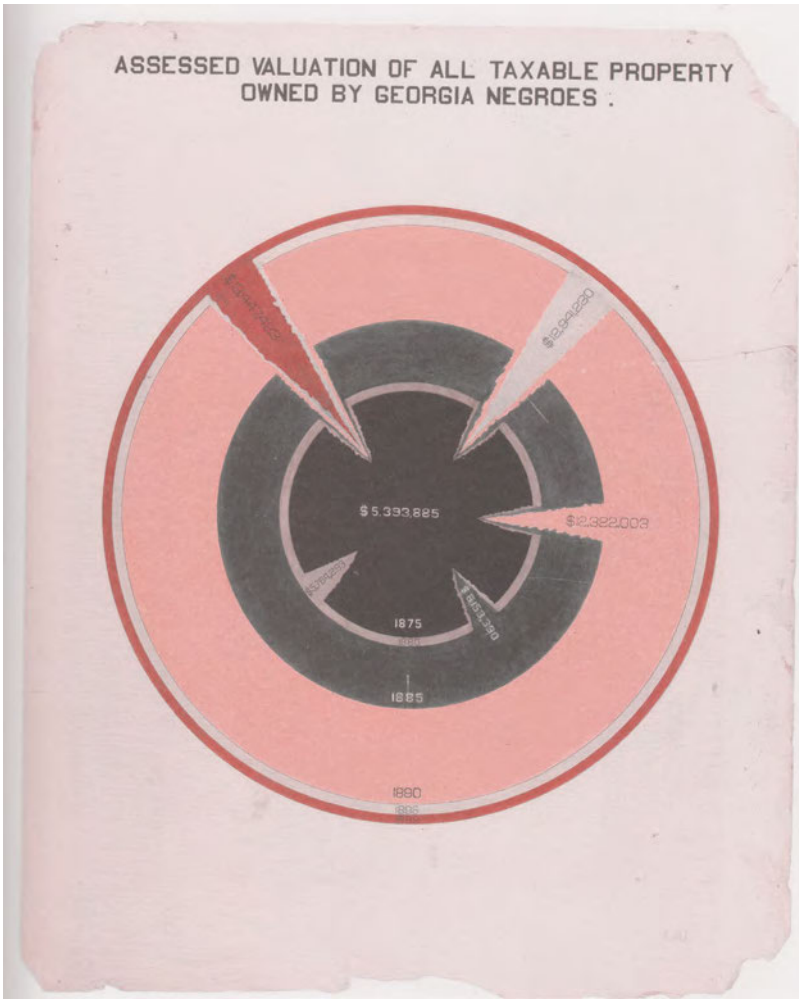

● FIG.6 ▶ Increasing quantities in the shape of colored rings. W.E.B. Du Bois: Data graphic for "The Exhibit of American Negroes", Paris 1900. Assessed valuation of all taxable property owned by Georgia Negroes.

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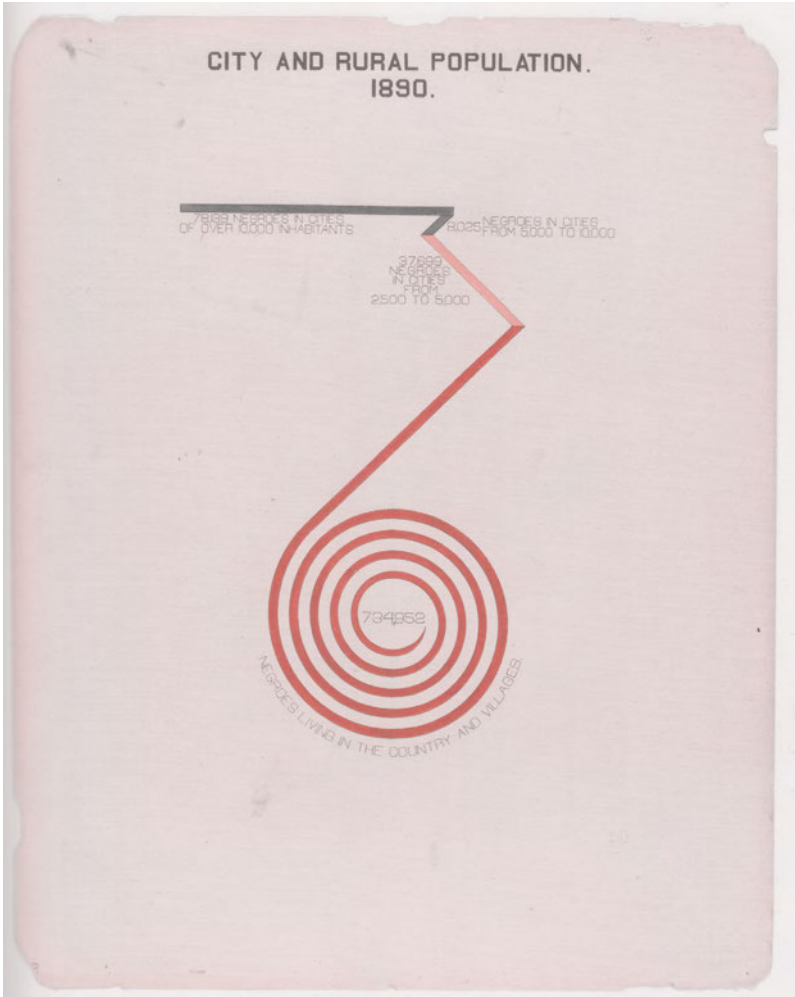

● FIG.7 ▶ Spiral-formed wound-up bar chart by W.E.B. Du Bois: Data graphic for "The Exhibit of American Negroes", Paris 1900. City and rural population 1890.

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And, panopticism as a rule reinforces the dominant political hegemony because to make a complex, messy situation "clear," panopticism must reduce that situation, and the hegemony is the one whose "grid of intelligibility" (Foucault 1973; 1990) determines what matters and what doesn't, what is ruled out and ruled in, what is foregrounded and what is backgrounded." (Olman, in press)

Du Bois "entered a field of competition dominated by social-Darwinist and white-supremacist justifications [...]" (ibid) by affirming the language of social statistics and synoptic data graphs and maps and by exhibiting at the 1900 World fair, which took place in the Western supremacist mindset of colonialism, industrialization, progress, and objective science. By delivering data about a marginalized and discriminated group of people, Du Bois' charts might even play into the wrong hands because, in line with Foucault, "panopticism – their at-a-glance reduction of complex issues – makes them tend to support hegemonic power structures in spite of their designers' intentions" (ibid).[3] Voicing criticism in the language of data graphics is bound to the framework of the factual and of the objectifying epistemology of Cartesian science. However, the author's status of power also changes the power of critique.[4] For such results are and remain part of the paradigm of an instrumental reason's feasibility. The expressiveness of the lines based on numbers is sober and cool, representing the

03 "An early and important effort in this turn, Barton and Barton (Barton/Barton, 1993) applied Foucault's theory of panopticism to argue that while infographics exhibit both modes of panopticism—the synoptic (generalization, overview) and the analytic (individualization, analysis)—infographics that are dominantly synoptic tend to support the hegemonic power of the technocrats who made and distributed the infographics, and to disempower lay viewers from feeling they have any agency to change the situation being depicted." (Olman, in press).

04 Du Bois might have had a professorship, but he had to cross the Atlantic in steerage (Battle-Baptiste/Rusert 2018: 17).

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ideal of the disciplined morality of objectivity developed in the 19th century. The rationalization took place in the mode of an objectivity that was authenticated and manufactured by machines or quantified procedures, a supra-moral, disciplined, and standardized form of knowledge that proceeds in a precise, cool, and measuring way. Consequently, they correspond to the ideal that historians of science Lorraine Daston and Peter Galison accurately described in the historical emergence in the 19th century as mechanical objectivity for different media and fields of knowledge (Daston/Galison 2007).

Thus, what Foucault understood by critique, namely "the art of not being so governed" (i.e., of not being so disciplined by methodological constraints), can be understood as a way of thinking and questioning that opposes all attempts to formalize methods. According to critical theory, such manufactured facts cannot be givens, because the numbers of statistics are socially fabricated. From them, even the injustice of social dominance can be deciphered.

MAKING DATA GRAPHICS OTHERWISE?

Nevertheless, Olman insists that Du Bois' graphical project did not fail because he was "embracing heterological strategies of technical visualization", since "he also innovated within the dominant visual topology mentioned above – framed by *topoi of comparison, part/whole, degree, space, and time* – to subvert viewers' expectations around Blackness, racialization, and socio-economic progress" (Olman, in press).

Barbara Orland and David Gugerli wrote in 2002 that, "[e]ntirely normal pictures do not require any justification. Everyone sees or knows them - no one reacts or wonders. If everyone thinks they see and understand the same thing, then that is reality. […] Because

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● FIG.8 ▶ Making data graphics otherwise? Reformatting of atlases by Simryn Gill: Four Atlases Of The World And One Of Stars, 2009, paper, glue.

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completely normal pictures gain their self-evidence by the fact that they correspond in their form to the expectations of their users and are made available in the given context of action" (Gugerli/Orland 2002: 9). William Playfair's financial curves, Minard's Napoleon's Russian campaign, Nightingale's Rose Diagram, Du Bois' chart designs, they are all famous for displaying data differently, unconventionally, and by confronting viewers' expectations and raising their awareness. This is an aim that must be achieved if one claims to do infographics otherwise. Here a path is laid out by Arturo Escobar in his book "Designs for the Pluriverse", in which he asks if "design's modernist tradition [can] be reoriented from its dependence on the life-stifling dualist ontology of patriarchal capitalist modernity toward relational modes of knowing, being, and doing" (Escobar 2018: XI).

Still, all of the graphics discussed throughout this chapter have not escaped the positivist paradigm of data graphics. This is something that is very hard to achieve from within the system, why only artists might be able to interrogate, lever out, undermine, or completely destroy the logic of infographics and, in so doing, make visible their a priori claim to envision facts about the world super-historically and without emotion. ○ FIG.8

So, do critical truth modes of data graphics have to fulfill all levels of critique, that is, be critical of the data, critical of the visual methods, and critical in the choice of subject? Can graphical methods, such as data visualizations, be used critically as counterarguments or forms of protest? Can these forms be critical themselves if the perspective of critical research nevertheless resists the 'iron language' of mathematical procedures? Is it even possible to work in the humanities without the positivist bias of formalizing methods? Or do all findings based on measuring, counting, or digital methods remain forever linked to the history of mechanical objectivity and the

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positivism of these methods and their "calculative rationality"? This needs further discussions that take not only who gets visible on a map into account, but which are also mindful of who is allowed to draw a chart at all. Here the triangle of critique comes into play again as a relation of the individual towards power and truth. This triangle needs to be extended to a quadrangle, a pentagon, or a polygon by applying the field of political ecology, including the relations among culture, power, politics, and nature.

→VIDEO LINK

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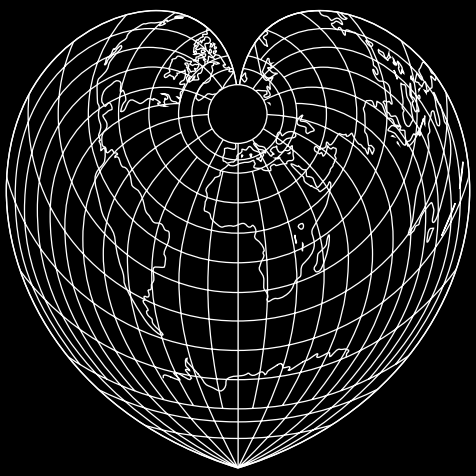
DESIGN THROUGH GRADUATION:



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Notes on the establishment of reality by scale

Graduating the world, things, or beings is a political ordering of reality through design. This graduation is carried out by establishing levels according to a hierarchy.
Two regimes of graduation can be discerned here and where: 1) graduation by scale is understood as a device and 2) graduation by scale is understood as a chain of being. The first returns to what Philippe Descola calls a naturalistic ontology, whereas the second involves the expression of an analogical ontology. Both regimes give rise to specific modes of mapping reality that both administrations and social organizations can use as a basis for their work of establishing reality. Both regimes are also modes of designing reality. However, these modes do not establish the same reality and do not have the same political effects.

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The aim of this text is to point out some political and ontological effects of the mode of establishment of reality by scale, according to whether it is naturalistic or analogical. While a naturalistic approach to scale has the effect of effecting scale shifts from the local to the global, and scaling of objects leading to subordinate relationships, an analogistic approach to scale does not necessarily resort to a hierarchical establishment of reality, but instead develops patterns of social and political links that are woven between beings in both a transversal and trans-specific way. The naturalization of scales and the effects of subordination that it is likely to induce are then replaced by a social and political organization that responds to a self-similar structure on an extended scale.

A scale is a degree of spatial or temporal resolution, a unit of time and space that is chosen to observe a phenomenon. A level of organization is an object established by the observer (Allen 1998) in such a way that it can be placed in a class of objects of the same kind. An individual is an element of a population in this naturalistic definition of scale and level, a part is a section of a whole, and a small part that is an element of a large one. A level of organization is, therefore, the product of an architectonic concept that arranges objects in a certain order. Ordered objects, levels of organization – the individual or the population, place, or territory, the simple or the complex organism – can each be analyzed according to different scales that define their granularity, their degree of precision.

A level of organization is a part of a hierarchy of levels of organization in the hierarchical theory of naturalistic cosmology. Thus, small objects (the individual, place, the simple organism) are nested within larger ones (population, territory, the complex organism) and the higher levels exercise control over the encompassing levels (Allen/Starr 1982). In the theory of progressive development in biology, the simple, the inferior, and the primitive – brewers for example – precede the complex,

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the superior, and the present, "preferably adult, white and aristocratic" (Balan 1994). This hierarchy is manifest in the synthetic theory of evolution proposed by Julian Huxley in 1942 (Huxley 1942). In this theory we find the idea of progressive evolution, represented by the concepts of anagenesis and rank. Anagenesis is a process of accumulation of evolutionary progress "through an ever better adaptive adaptation of species to their environment", from nucleoproteins to humans, including chromosomes, nucleated cells, and multicellular organisms. A grade is "an anagenetic unit", i.e., "a set of living beings that share the same stage or general evolutionary level" (Tassy 1991: 99-100).

The use of grade or level also manifests itself in geography, subordinating place to territory, or locality to globe. In the modern nation state, the state encompasses the multiplicity of territories and localities. Place no longer means anything in itself, but only in terms of the whole by which it is situated and instituted. It is de-located, de-particularized so that it can, through this abstraction work, lend itself to universalization, monopolization, and the concentration of power (Bourdieu 2012: 351). The locality occupies a subordinate and contingent position within the anthropocene. It can no longer be said that one can "act local, think global" on a planet understood as a system, or that locality is no longer an adequate response to political action: a reduction of local externalities is useless if the concomitant global accumulation of externalities has spun out of control (Federau 2016: 148).

Here we find a figure for the scheduling of the world that occupies the heart of theories of ecology, biology, geography, or territorial administration that subordinates the small to the large, the simple to the complex, and the local to the global. This figure is undoubtedly a secularized version of a theological ordering that attests to a cosmic design.

Another theological ordering could reverse this hierarchical figure, one in which the small is no longer subordinated to the great, but the

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great to the small, the complex to the simple, and the powerful to the weak. This schema would reinterpret Paul's phrase from the *Second Epistle to the Corinthians* (12.9) geographically, biologically, historically, and administratively according to which, "my power is fulfilled in weakness". Paul's sentence could then be translated in several ways, which might be stated as follows: my complexity is fulfilled in simplicity; my greatness in smallness. This could also involve returning to two of modernism's principles: "Less is more" and "Small is beautiful". These two principles seem to inherit a great deal from the Protestant ethic; "Small is beautiful" reverses the hierarchies of the administered industrial society, whereas "Less is more" seems to realize its secret program.

"Small is beautiful" is a moral principle that can be found in Diogenes, in Christian hermit practices, in Gandhi's ethics (inspired by John Ruskin), and in the Arts & Crafts movement, or in Marshall Sahlins' famous book "Stone Age, Age of Plenty". It refers to a policy of self-limitation (of working hours, consumption, and administration). "Less is more" is more ambiguous and is one of the emblems of functionalist modernity. It was first stated by one of the directors of the Bauhaus, Ludwig Mies van der Rohe, and it has been translated into a promotion of the standard, a rejection of the ornament, and as an apology for the free plan brought about by reinforced concrete. "Less is more" combines formal minimalism with utility and profitability. The artist Carl Andre once said that "[A]rt excludes the unnecessary", thus taking up the features of ascetic rationalism, of which Protestantism was one of the standard-bearers and which, through Beruf's ideas, formed one of the fundamental elements of the spirit of modern capitalism (Weber 2002). Simplicity, therefore, has two very different social and political-administrative meanings here. The first refers to a political organization that is self-managed by its stakeholders (Small is beautiful) and the second refers to efficiency, to an economy of the apparatus (Less is more).

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Translated into political anthropology, this principle would attribute greater virtue to small human organizations, since small size is a necessary condition for democratic organization. Small, also weak, is also the condition for an optimal quality of life (Kohr 1995). Small also makes it possible to escape the collapse of civilizations caused by the rapid and sudden simplification of a society that has become too complex (Tainter 1988). For example, Dennis Meadows, an MIT researcher specializing in systems management and co-author of the famous Meadows Report known as 'Halt to Growth' (1973), after more than 40 years of carrying out various simulations of the Earth system, recently called for the urgent need to train resilient microsystems because of large organizations' inability to rapidly face the challenges presented by the anthropocene (Meadows in Sinai 2013).

A third approach to relations of level, size, and scale no longer start from an antagonism between a zenithal (global) and a telluric (local) point of view, but instead seeks to combine them to achieve multi-level, polycentric governmentality. The notion of multi-level and polycentric governance has been one of the structuring axes of Elinor Ostrom's work on the analysis of institutions, and, more broadly, of the *Workshop in Political Theory and Policy Analysis* launched with her husband in the late 1960s in Bloomington (Fontaine 2019: 257). In his analysis of ecosystems, O' Neill shows that systems are structured by nested levels of organization, each associated with states and processes at particular spatial and temporal scales (O' Neill et al. 1989). Thus, management adapted to a local community may not allow resilience on a more global scale (Walker et al. 2006; Levin/Lubchenco 2008). No system can be understood if it is studied at only one scale (O' Neill et al. 1989; Walker et al. 2004). The panarchy here refers to a set of dynamic systems that are nested at several levels and scales (Gunderson/Holling 2002).

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THE DESIGN OF SCALE AND LEVEL

The design of social organizations, and therefore the design of public action too, aims to manage and govern social complexity by means of order through graduation and hierarchization. The latter will configure infrastructures by means of centralized or speckled, tiered, or distributed frames, each in its own way, which will seek to reduce social complexity: "The formation of opinion and will by means of discussion (...) [is] not complex enough to be able to integrate and process the knowledge necessary [for the organization and management of complex societies] from an operational point of view" (Habermas 1997: 346).

The overcoming of individual or collective cognitive capacities to deal with social complexity, in the name of reducing complexity, legitimizes the subordination of the particular to the general and the more or less radical elimination of contexts, thereby reducing the diversity lurking between the lines, "the very diversity that could upset the order of things" (Tsing 2017: 78). The management of COVID-19 in France has clearly shown such a *modus operandi*, generalizing the same control and public health measures to the whole of France, from the depths of the forests or the uninhabited mountain tops, to public transport at peak times in the metropolitan capital. This way of reducing complexity generates distortions of reality and systemic violence. The generalization of an analysis to an entire territory, carried out on the basis of samples or a particular context taken for a universal model, is caricatural. However, the causes of sustainability problems can be understood as problems of scale and inappropriate scale translations: "[L]arge ecosystems are not simply enlarged small systems, just as small ecosystems are not microcosms of large systems" (Ostrom et al. 1996).

The apparatus for the passage, management, or combination of scales and levels is a political operator. It imposes a mode of management and the administration of heterogeneity.

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Criticism of this managerial or administrative simplification has led to a desire to favor the small scale in social and political organizations (Kohr 1995). The social and political determination of what can be understood by 'small' remains the subject of controversy and varies according to the objects that we speak about. André Gorz questions the relevance of 'always impoverishing' community autarky with regards to the relationship between political scale and the scale of production: "The more self-sufficient and numerically smaller the community is, the more restricted the range of activities and choices it offers its members" (Gorz 1980:153).

It is for this reason that Gorz calls for a dualistic organization of social space, one based on an inversion of hierarchies, subordinating one sphere of heteronomy (large scale) to a multiplicity of spheres of autonomy (small scale). Heteronomy is a work of general interest, forced labor ensuring the programmed, planned production of everything necessary for the life of individuals and the functioning of society. Autonomy is free, non-market production in which individuals generate material and immaterial goods and services, either alone or in association, which are not necessary, but which conform to the desires, tastes, and fantasies of each individual (Gorz 1980: 145). This distinction between the political and the productive scales is made necessary in order to preserve everything that has been acquired and developed by the division of labor and that cannot be produced at the scale of a family, a team, or a commune, such as telephones, videos, bicycles, solar batteries, microprocessors, etc.

The problem here is in the combination of the capacities of the different scales of production, both socially and politically. While some lend themselves to autonomous management at a local level, others need to be concentrated to be optimal and lend themselves to heteronomous organization. For example, process industries must be concentrated, given

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that this concentration has made it possible to excel in economic performance through the effect of scale (reduction in the quantity of labor and energy per unit produced, etc.). In a local process industry, there would be an increase in energy consumption and a multiplication of high-tech equipment, space, and resources consumed. Localized industry, with its autonomous political organization, does not apply to process industries but to soap factories, breweries, factories of everyday objects, on condition that they do not require too much investment or too many machines. The third category of industry, the network industries (such as water, gas, electricity, telecom, sewerage, and transport) are at the crossroads of scales.

The determination of scales of production, and the consequence it will have on both design and social organizations, is understood here in a certain naturalistic regime in which space and time are structured by a hierarchy of sizes and levels. However, naturalistic ontology can also lend itself to a multi-level and polycentric perspective, in order to escape the effects induced by the priority given to one level over another, be it large or small.

Panarchy can be defined as the theory that integrates economic, ecological, and institutional systems and that explains the situations in which these three types of systems interact, adopting a multi-scale and trans-disciplinary perspective (Gunderson/Holling 2001: 5). This apparatus, which moves away from the antagonism of the particular (the local) and the general (the state), integrates dynamics of change across space, from the local to the regional to the global, and in time scales ranging from months to millennia. In this way, the limited perspectives used in the sciences, which tend to simplify things by concentrating on one scale, are overcome. Panarchy can be understood as a new form of naturalism.

In economic and institutional terms, such a trans-systemic, polycentric, multi-scale, and multi-level approach provides the background

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for a new mode of governance of planetary life, a system of systems based on NBICs, mathematical and computer models applied at global scales, and control measures for human and non-human network actors (Gosselin/Bartoli 2020). The political antagonism between the scales of governance is overcome by a system of systems that is capable of integrating all forms of technical otherness (small production plants, constructive autonomy, heterogeneous assemblages of housing, and low-tech neighborhoods) as well as all forms of existential diversity (Vidalou 2020).

GOVERNING SCALES: FROM NATURALISM TO ANALOGISM

The scale is a device which, like any device, has the capacity to capture, orient, determine, intercept, and model the gestures, behavior, opinions, and discourse of living beings (Agamben 2006). The state apparatus as a system of systems is the scaling operator of objects and, at the same time, the apparatus operating the translation from one scale to another.

A mapping of the state can account for such a device. One might perceive – as was the case in a 2006 and a 2019 cartography – the stratification and the ascending and descending graduation as something intended to ensure the governability and productivity of all objects. ○○ FIG.1,2

The state can be defined here by its capacity to operate scale transitions, from local to global, and in the scaling of objects. The mapping of the state suggests the power of normalization and scalabilization, which integrates heterogeneity into a whole that forms a system, and which discriminates between what is inside and participates in the system, and what is outside (what is excluded from this system and that which does not fit in with the state's design and its purposes).

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This line of demarcation intersects with another between two modes of production of scale; this can be traced back to the distinction made by Philippe Descola between naturalism and analogism where scale is understood as a device (a tool that aids the state in its activity of administration and government) and where scale is understood as a living order. The latter meaning of scale is found in analogism.

Analogical societies differentiate beings by their interiorities and physicalities, but weave between them correspondences (analogies) that give them the same substratum. One of the figures of such a cosmology is the chain of beings (Lovejoy 1966). One of its formulations can be found in Aristotle's De anima, for example, which states that nature gradually passes from inanimate to animate forms, according to their degree of perfection. The scale of beings is not a unified doctrine or philosophical system, but a complex and heterogeneous aggregate.

Historically, one can distinguish between a scale of beings that responds to a hierarchical social order and a scale that responds to a republican order. The first is manifested notably in Christian analogism, where power extends God's jurisdiction. The king is the shepherd who leads the flock of men on the path of bona vita and salvation.

The secularization that took place with the French revolution replaced this regime of incarnation with a regime of representation, in which the king is the substitute for the highest person on earth. However, it maintained a principle of hierarchy, simply substituting an earthly monarchy for a celestial one. The republican scale of beings can also move the matrix.

In the republican scale of beings, there is an articulation of a natural right, a political right, and a political economy according to the physiocrat Dupont de Nemours' 'Philosophy of the universe' (1793). Political economy and natural history are not two separate objects. Metempsychosis is the vehicle of a trans-species

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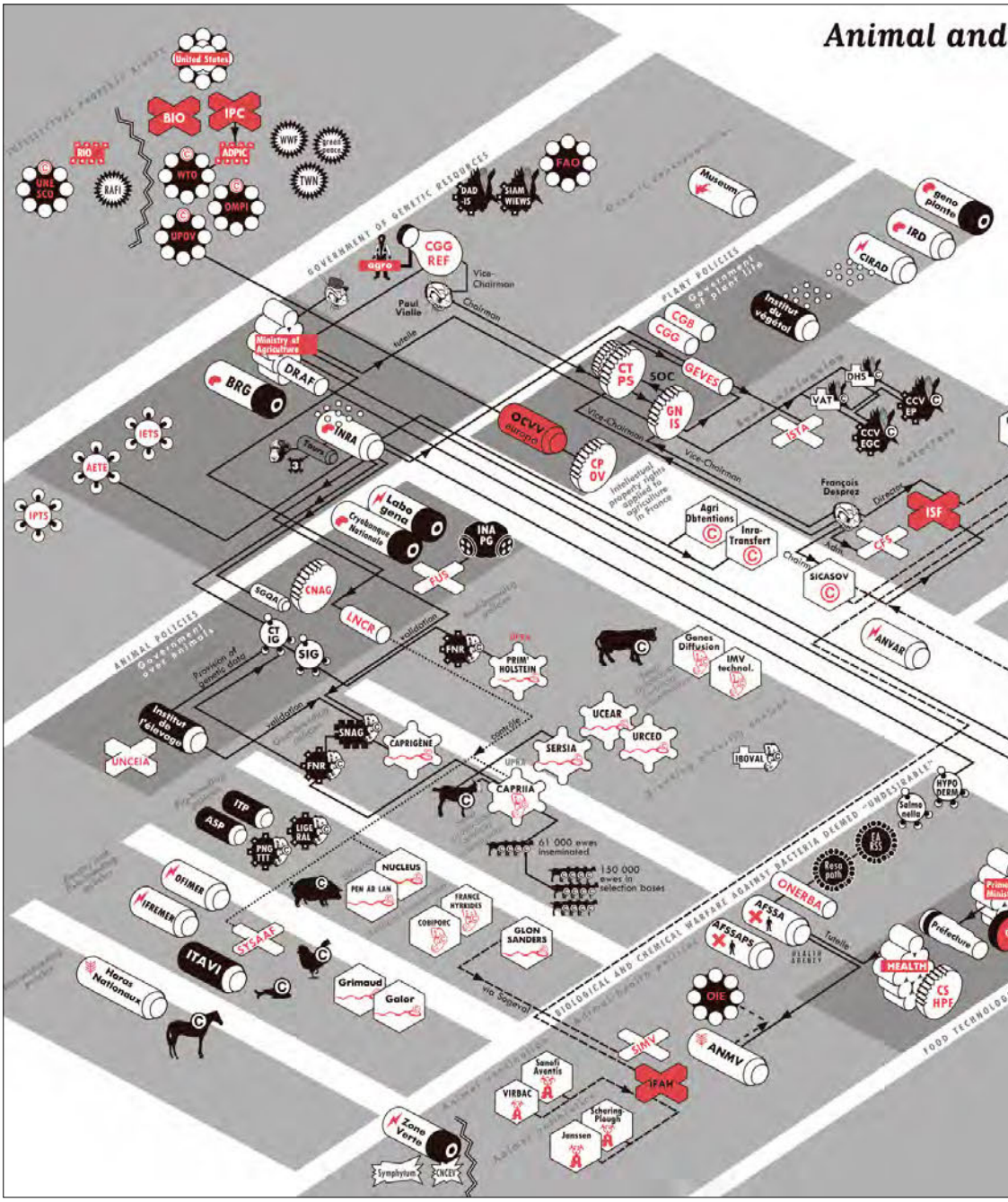

● FIG.1 ▶ Animal and vegetal programming.

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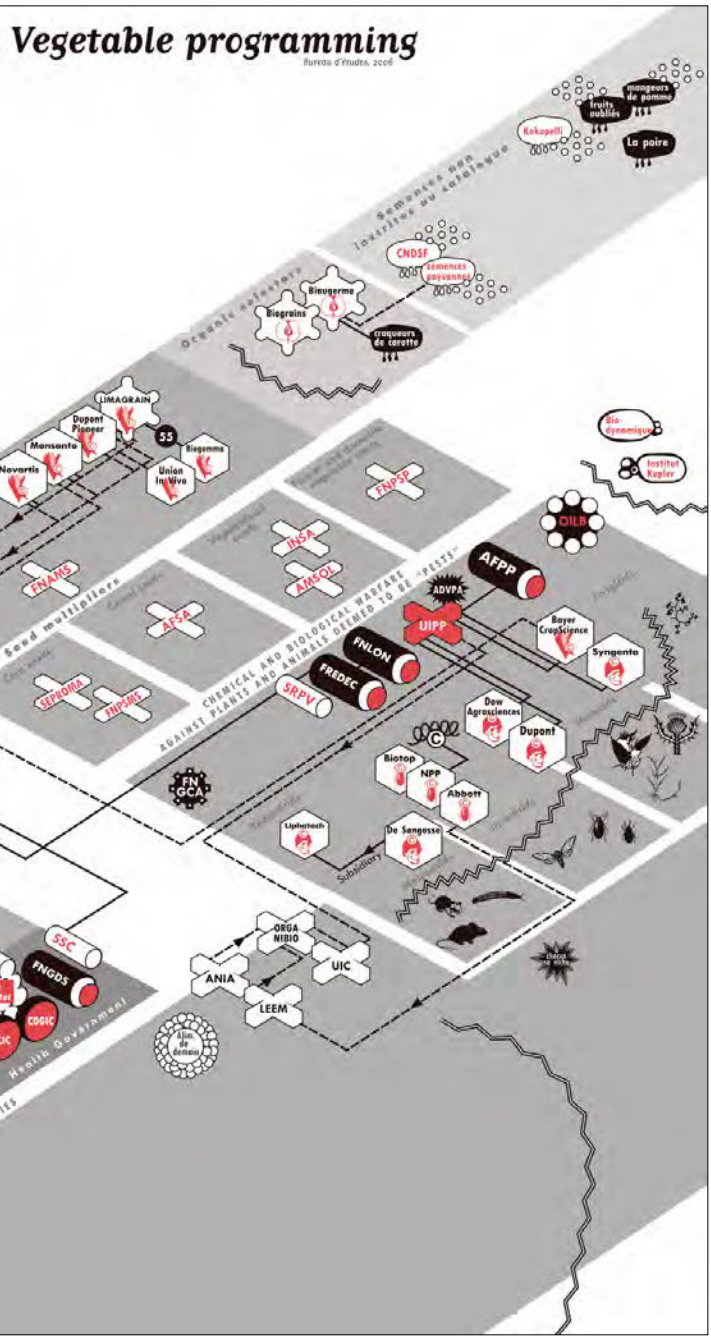

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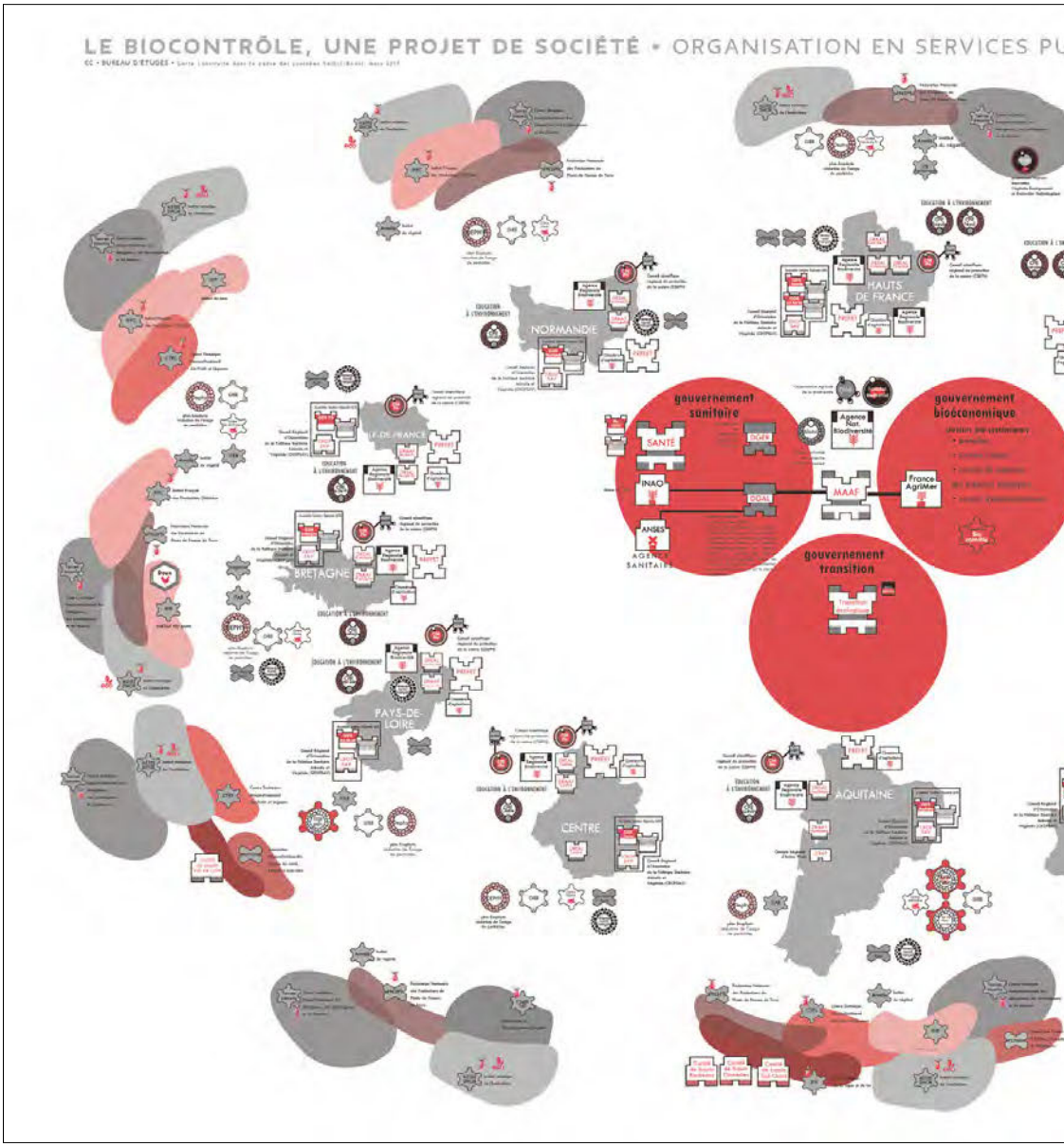

● FIG.2 ▶ Sketch of the territorial administration of agriculture in France.

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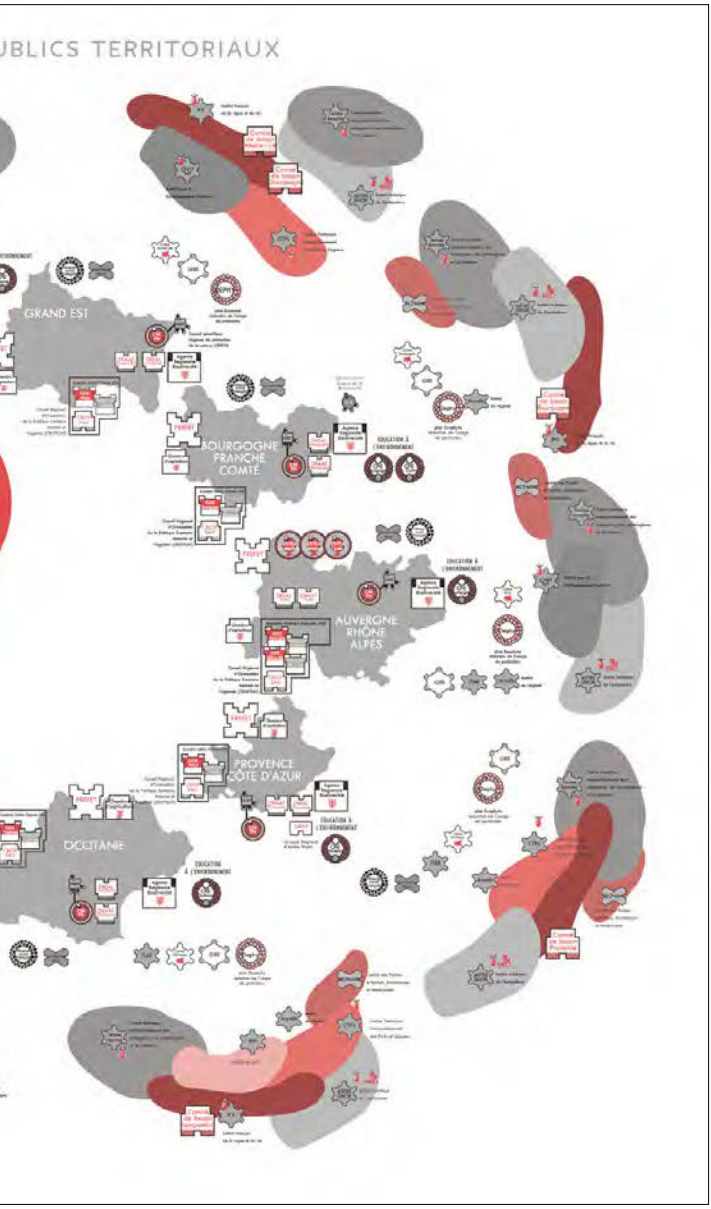

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morality in which species are susceptible to progress according to their capacity to domesticate their environment and forge alliances with other species (Vincent 2018).

What differentiates the analogical scale's regime, as formulated by Dupont de Nemours, from that used in naturalism can be seen in the aforementioned relationship between form and function. Form follows function in one case and in the other function follows form. There is an architectural concept in both cases, but it functions in a very different way. The distinction between these two ways of thinking can be seen in the distinction between the concept of function in the work of naturalist Georges Cuvier and that of form found in the work of Geoffroy de Saint Hilaire.

Cuvier has used the concept of an 'organizational plan' to account for the relative disposition of an organization's different constituent parts: "All being organised forms a whole, a single, closed system, all parts of which correspond to each other and contribute to the same definitive action through reciprocal reaction" (Cuvier quoted in Gould 2006: 415). The function here determines the structure: "If there is coordination and correlation between structures, then the functions are interrelated in a hierarchical organization" (Gould 2006: 414). In a functional organization, one can give the pre-eminent place either to the element (the individual, the cell, the locality), or to the whole (the population, the complex organism, the globe). Alternatively, we can also adopt a multi-level and polycentric approach to functional organization.

In Saint Hilaire's work, on the contrary, there is a structural constraint: "Form has priority both in logic and in time over function. (...). Function does not create form; in fact, it is form that finds a function (...) Parts of the anatomy may expand or contract according to their use, but the topology remains unchanged, and the archetype can be reconstructed on the basis of the invariance of the distribution of anatomical elements in space" (Gould 2006: 420).

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Geoffroy de Saint Hilaire's form or archetype has no scale, only a topology.

This distinction gives rise to two very different types of social organization. In Cuvier's functionalist schema, we find the configuration of the administered state, as noted above, which both discerns parts and a whole, and different modes of hierarchization and interrelation between functions or individuals. This organization's configuration would depend on the conditions of existence. This is a kind of naturalization of the administration of scales. The configuration of the state, its anatomo-physiological scheme would correspond to its conditions of existence. We find a very different social and political organization in Geoffroy de Saint Hilaire's structural scheme, one which would instead correspond to a primordial form which, like the commune in Tocqueville, would have a self-similar structure on an extended scale.

→VIDEO LINK

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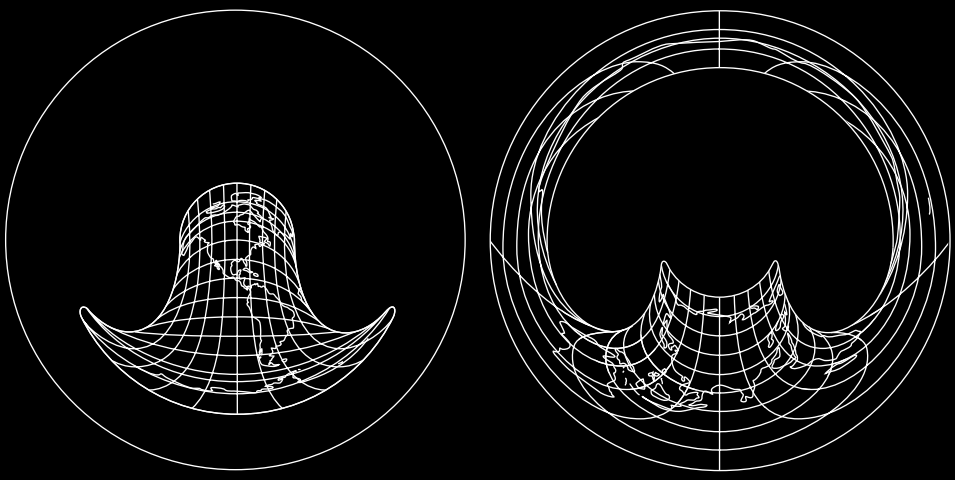
RADICAL CARTOGRAPHY



Philippe Rekacewicz

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Between science and Politics, the art of making visible what the world hides from us

The cartographer produces a vision of the world as he or she sees, understands, and interprets it. In this respect, the map is fundamentally a political object and it allows us to concretely expose those (geo)political, social, and economic mechanisms that are generally invisible to us. The map has nothing to do with reality – or the so-called "truth" – although it is inspired by it and takes the information that it represents from reality. The map includes a lot of the imaginary of the mapmaker who put her or his own interpretations within it. Therefore, the map becomes a permanent dialog between reality and imaginary: The map then brings out the image of a world that we did not suspect, one that we had not seen before, suddenly making the invisible visible. This dynamic is also an open door to manipulation and the use of the cartographic image as a propaganda tool, both from the "power" point of view as well as that of the "activist', making maps an intellectual construction primarily, rather than a faithful figuration of a reality.

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THE RIGHT AND THE POWER TO MAP

Who really has the right to create and to produce maps? The question can really seem strange, given that the geographical map is an object that has been almost naturally inserted in our lives, in the objects that nourish our everyday life. The answer is not so straightforward, because mapping was a very exclusive discipline historically. It was reserved for the restricted circle of states, of powerful monarchs who had a monopoly on both the production and use of maps. This was all for a very simple reason: because whoever had the map, in other words the immediate vision of an immense territory, could capture in one look the full extension of their territories and colonies, and was assured of having complete control over those, and thus over the communities that inhabited these areas.

> **"The map has disappeared! The map? Yes, master, the one which the king commissioned from you […] Not leaving time for Alberto Cantino to catch up with him […] Master Reimen […] comprehended instantly the scale of the catastrophe. Two months previously, the king […] had passed down the command to him: henceforth recognized by the Pope as "lord of the conquest, navigation and commerce of Ethiopia, Arabia, Persia and India," the sole sovereign with mastery of the maritime routes leading to the land of spices, he desired to have constantly presented to his view the extent of his empire, to be imbued with it so thoroughly as to make decisions in conformance to his commercial and religious responsibilities". (Vindt 1998: 7)**

The scene takes place in Lisbon in 1502. In a gripping narration of historical romance, the historian Gérard Vindt tells of the theft of a royal planisphere from a cartographical studio, the only one of its kind, upon which are represented the Indies and Brazil, designed for the first time according to the observations and surveys brought back by the navigators

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FIG.1 **Pedro Alvares Cabral and Dom Vasco de Gama. ○ The disappearance of the map, considered to be a state secret, is experienced as a genuine economic disaster by the sovereign because he is thereby deprived of access to his resources. To possess the map, the geographical information, to have knowledge of the locations, does not only assure the affirmation of his authority, but also offers the protection of his riches and a means of jealously guarding against its seizure by someone else.**

Technology's recent evolution has challenged this exact aspect of the cartographic domain, as it is now possible to create maps, completely independent of the authorities and with minimal financial investments. While cartographic production was the privilege of a small handful of over-powerful actors for centuries, today anyone can "make their own maps". This radically changes the social configuration with regard to the distribution of power, or at least of the tools that give power.

This issue is addressed in a small, but very powerful book *Les petites cartes du web* (Noucher 2017), which explains that this "digital revolution" allows anybody to map anything (however badly or inexactly) and that makes the difference, socially and politically, because the map can easily be used as a tool to implement a "counter-power" to try to fight those with "too much power". This is exactly why the discipline of radical cartography is sometimes called "counter-cartography", given that it aims to oppose conventional visual representation – often produced by those same individuals in positions of power – and which generally give a very unambiguous view of the world, one favorable to those who run politics and the economy.

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RECLAIMING THE POWER OF THE MAP TO RECLAIM MORE SPATIAL JUSTICE

In 2003, Alice Creischer and Andreas Siekmann invited a bunch of strange people for one full weekend to the Hebel theater in Berlin, in order to discuss and exchange ideas on "radical cartography", or to put it differently, "another way to make maps" to depict the world, to transform it into a relevant image, to figure out the way we see it, and how we understand it. This approach opened a whole new field for cartographic experimentation.

The collective *bureau d'études* from France, among others, has presented their tremendously complex and meaningful artwork, showing the world in a very systemic respect, eaten by capitalism in general and by military-political-industrial complexes in particular. The *Grupo de arte callejero* from Argentina has identified and mapped the private residences of all persons responsible for the former dictatorial governement, making it public, and has organized "touristic" tours of Buenos Aires, passing by each of their houses and recalling the crimes under their dictature that went unpunished at every stop (they even managed to get some of them convicted and eventually imprisoned). A group from New York, The "Institute for applied autonomy", put together one of the most original and stunning "radical cartographic projects" in the 2000s, thanks to hundreds of students and participants who spread out throughout the streets of Manhattan to track down and locate the slightest video surveillance camera, in order to map them and find itineraries from South to North that could possibly avoid them, allowing any citizen to walk in the city without being seen by unknown eyes. ○ FIG.2

This shows the value and diversity of what can be done with maps: they are an effective tool for reporting on crimes and injustices, but also an art through which to show how we interpret, feel, or perceive the world as we think it is (an attempt to represent reality) and, eventually, a fantastic tool to show how we would

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● FIG.1 ▶ "Cantino's Planisphere", 1502, Estense Library of Modena [Italy]. This map shows the state of Portuguese discoveries up to 1502. Knowing these territories was of real strategic and commercial interest. Flags show the different territorial sovereignties. The division line of Tordesillas cuts off the future Portuguese-speaking part of the South American continent, which would become Brazil.

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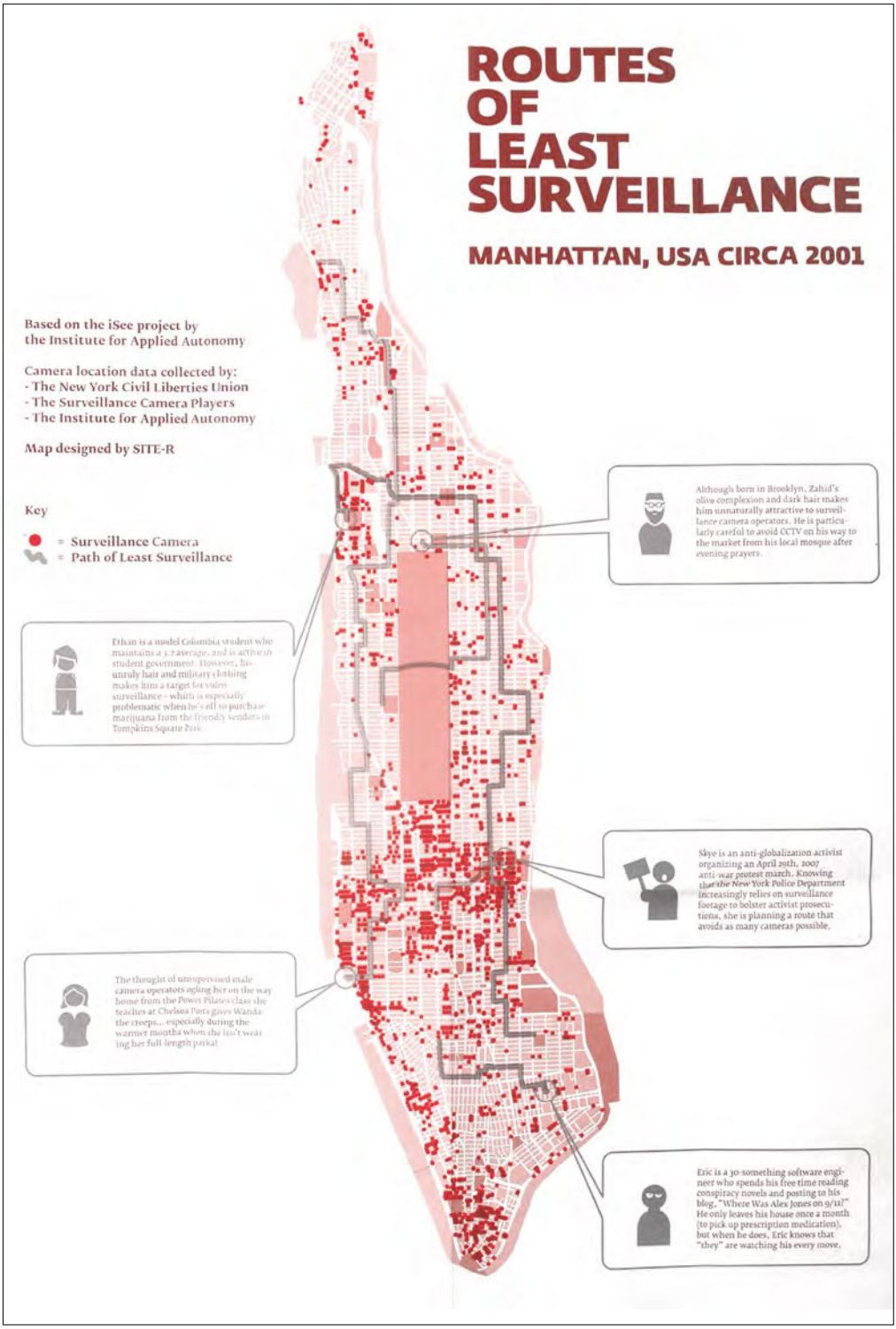

● FIG.2 ▶ Institute for applied autonomy, published in "An Atlas of Radical Cartography", Journal of Aesthetics and Protest Press, 2007.

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like the world to be (an attempt to represent utopian worlds).

This requires us to rely on a number of postulates: we should accept the idea that the geographical representation of the world is more of an intellectual construction than it is a faithful depiction of reality: The map is always an interpretation of how the mapmaker sees, understands, and interprets the way in which the world functions. If a cartographer produces a vision of the world as he or she sees, understands, or interprets it, then the map can allow us to concretely expose (geo)political, social, and economic mechanisms, which are generally invisible to us, even though the form remains a political object.

The map has little to do with reality – or the so-called "truth" – although it is inspired thereby and takes its information from reality. It includes a lot of the mapmaker's imaginary who puts her or his own interpretations therein. Therefore, the map becomes a permanent dialog between reality and the imaginary; by taking into consideration that what is being represented on a map has its roots in reality, it is also deeply romanticized, much like a fictional movie. Our maps "create" a world more than they "depict" it.

Therefore, the result of this process brings us images of a world that we might not have expected to see, a world that we have not necessarily seen before. This may help us to understand it better, but we may become aware that it might also be an open door to manipulation and the use of the cartographic image as a propaganda tool, both by the "powerful" as well as by the "counter-power" sides.

Mapmaking is a fusion of disciplines as scientists, politicians, and artists all create and use maps in the field of their own environment. This shows the very complexity of what a map really is: it uses data that has to be handled "scientifically", it uses forms, colors, and movements; in other words, "artistic means" that are all found within a modus operandi that

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must respect a certain "ethic". As a cartographer, geographer, information designer, I feel as though I live at an ambiguous interface between exact science and art, flirting with economics, politics, and social issues.

For decades, the cartographic image was more "in the service" of the prestige of the text, highlighting it rather than being an informative or a knowledge element in itself. It was considered to be a pure illustration of the narrative, without real signification other than for illustrative purpose, something to help readers locate themselves in the geography (where objects and human beings are really found). For the past few years, though, there has been a shift and society has dramatically changed toward the glorification of the image, minimizing de facto the value of the text, something increasingly considered to be less accessible and more visually fuzzy. The image, the drawing, is more immediately visible and is supposed to offer faster access to information.

There has always been an obvious need to identify things, countries, nations, etc. This was the goal of almost all of the geographers, cartographers, and other map producers down through the modern and contemporary historical periods. This is what led to the production of tons of what I would refer to as "descriptive" maps, most of which did not say much more than what we already see or know.

This was precisely the reason why the anarchist geographer Élisée Reclus (1830-1905) hated maps so much and was actively advocating their "eradication" from the school system! (Ferreti 2009) He argued that they were poor and sterile, that they gave to the pupils a totally wrong image and understanding of the world around them, and that maps avoid showing the tightly interrelated and systemic nature of the planet as it "performs". Reclus' approaches really opened up cartography to an infinity of new possibilities, initiating an original and meaningful 'systemic cartography' (where everything is linked to everything and shows the world as an interrelated system), which relegated the

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'descriptive cartography' of orthodox geographers to the rank and file of a simple graphic or visual database. This turning point, initiated by Reclus, had been timidly started a little earlier the same century by personalities who were neither geographers nor cartographers.

RADICAL CARTOGRAPHY'S SEEDS HAD BEEN SOWN FOR TWO CENTURIES

Some forerunners already started to conceptualize and apply this so-called "systemic" approach, such as the economist William Playfair (1759-1823), the civil engineer Charles Joseph Minard (1781-1870) who introduced the idea of proportionality, and less well-known thinkers, such as the publisher, printer, and engaged citizen Henri Dron (1825-c.1915) who produced their "carte des points noirs" in 1912, anticipating future geopolitical links between nations.

It is in this spirit that the philosopher and economist Otto Neurath (1882-1945) produced all visual representations and maps over the course of his life, but he added something more to this approach: He put a lot of thought into transforming socio-economic and political knowledge into images that could potentially be understandable by all, including non-educated and illiterate parts of the population. The aim was that crucial information and knowledge would be no longer restricted to the upper, educated classes.

These precursors sowed the seeds of alternative forms of geography and cartography which later (re)appeared in the 1960s among geographers who went back to the well to retrieve some of these contributions and in order to engage new "radical" practices, initiating the movement of what we now call "radical" or "critical" geography. These ventures appeared in the framework of the civil rights movement and were developed as a tool to make social and spatial injustice visible. The geographer

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William Bunge (1928-2013) was, in this respect, a major player, experimenting and implementing "a radical way" to map how authorities and communities were producing, operating, and disputing their daily living spaces. His ideological and methodological contribution served as a really rich, multidimensionnal inspiration for geographers and cartographers who had been looking for alternative mapping modes since the very beginning of the 21st century.

In 1967, he was blacklisted by the government because he was a communist sympathizer and, as a result, could no longer teach within the University system. One year later, together with Gwendolyn Warren, he founded the Detroit Geographical Expedition and Institute within the Society for Human Exploration and conducted research on the black Fitzgerald neighborhood in Detroit, Michigan. From this investigation, he produced a book that became a reference text from then on (Bunge 1971).

He settled his office and mapping workshop in the poorest block of Fitzgerald (an agglomeration of Detroit), in a resident's house. He then worked collectively with members of the community to produce maps dedicated for use as "evidence" and "prosecution documents" that could be presented in courts to prove "social injustice". His aim was to encourage Fitzgerald's citizens to regain collective power and to fight alienation processes, confiscation, seizure of public lands, and ultimately, to claim a certain level of soveregnity on the area, or at the very least the right to particiapte in the decision-making processes. This project, in particular, established the basis for alternative, experimental, or sensitive/emotional cartography as it is practiced today. Bunge managed to implement a mapping system through which the hidden part of social and political processess (the invisible) was depicted in an obvious and a very tangible way (the visible). It was a very committed and resolute way to map struggles for social and spatial justice, and to denounce questionnable economic and political practices. This is why Bunge created –

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out of data gathered collectively among the residents – some maps, such as "The number of children run over by white commuter's car driving" throughout Fitzgerald, from their wealthy residential neighborhoods to downtown where they were working, or "number of babies bitten by rats": although this map was only published in 1988, it represents the results of one of the many research projects carried out by Bunge and his team in Fitzgerald in the 1960s, where he carried out all these projects that intended to "spatialize" – and thus to make visible – all aspects of this neighborhood's social and economic life in all its unfairness and indecency. ○

FIG.3

Being radical or critical – or even experimental– does not necessarily mean that we must create new forms, new compositions, and new design. That aspect is without a doubt an essential component of the radical approach. However, we can also be radical through our "cartographic intention" and political stance. These two dimensions make radical cartography a rich combination of sensitivity, art, sciences, geography, politics, and social activism.

This is a very [free] exercise of "space/spatial deconstruction" in which cartographers allow themselves to pervert cartographic classical convention. This is how these "experimenters" brought to light the extraordinary "power of maps". They have proposed new ways of mapping that include new methodologies, new approaches that lead to making visible all that had previously been invisible as movements and trends in order to show the narrow geopolitical links between countries and continents. The ultimate aim was to eventually provide an understanding of highly complex economic and political systems in a simplified, but not simplistic way. Therefore, the cartographic image has been increasingly emancipated from the text and has become an "information media". In other words, maps have become an "element of knowledge" in itself, so much so that they alone can convey a message to an audience.

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TO MAKE VISIBLE ALL THAT WAS HIDDEN OR UNKNOWN

A map, which is a minute representation of vast territories, is a truncated picture of reality; we could almost say that it is a lie by omission. Representation by symbols always requires sacrificing information. Not everything that happens over an area of hundreds of thousands of square miles can be contained on a small sheet of paper. The cartographer selects the items she or he wishes to represent on theoretical grounds. His or her job is to synthesize, simplify, and to omit. Ultimately, his or her final product is a filtered document. Aspects that may be important – but are more usually considered secondary or superfluous – are removed. The map is simplified to make it legible. In so doing, the author imbues it with his or her own vision of the world and his or her own priorities. Even though we might be mapping an apartment, for example, we will still carefully choose elements to be shown, and also dedicate a great deal of time to finding the appropriate symbolic language through which to represent those. This is precisely where we open doors to manipulation and propaganda in visual representation.

Individual or collective "alternative mapping projects" have blossomed all over the world, covering thematics as diverse as finance, surveillance, security, consumption, marketing, social, and spatial justice. In the 2010s, the movement became even more powerful through the use of new technologies (cartography 2.0 softwares and applications) and social networks (especially in the collection of collect primary data and statistics, but also to disseminate and promote ideas and findings).

New maps were published and made accessible to as many people as possible via the Internet, and these showed new aspects of the global landscape, making visible that which was not previously visible, highlighting strategies and processes that the authorities had kept very discreet until that time. We were used to dealing with a geography of the visible that provided us with factual information,

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perhaps interesting information, but always incomplete informaton even if this was something that we did not necessarily know. Who among us has not studied the geography of oil in school books, with these very traditional maps of the areas of exploitation (Gulf Region) and the main maritime transport routes to the regions of consumption in Japan, Europe, and North America? This was in itself "information", but what we did not know, because it was neither written down nor mapped, was that loads of petroleum products could be bought and sold several times during the journey that had been mapped, from tax havens or, at best, from countries with very favorable tax regimes including Switzerland or Luxembourg. The financial flows that accompanied the physical flows of this raw material are at least as important to know in order to fully understand the geography of energy, but this information was somehow kept from us. It is precisely this knowledge that radical geographers and cartographers have rehabilitated and decided to bring to the public's attention.

In 2006, the artist and activist Trevor Paglen published a map of the CIA's secret flights between 2001 and 2006, depicting the US secret program of the international transfer of prisoners to foreign countries where they were either interrogated or possibly tortured. ○

FIG.4

Paglen had set up a truly original method for collecting information that has made it possible to draw up a network map of these air flights, based on the compilation of public databases reflecting aircraft movements on the one hand, and on the observations of many individuals in airports in North America, Europe, and Central Asia on the other. It was briefly posted on a large billboard in Los Angeles, which greatly displeased the FBI, who arrived immediately to remove it. But the FBI arrived too late as it was already broadcasted on TV. In the end, Paglen's initiative led to the termination of this program.

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Maps are subject to all kinds of manipulation, from the crudest and most obvious to the most subtle. They are eminently political objects and governments rightly consider them to be an effective propaganda tool. Activists, and citizens engaged in social resistance more generally, also use mapping as an efficient tool to report abuses of power, speculation, too much control from powerful states, corporations, and other large institutions.

ONE ROOM, TWO AMBIENCES

Mapping is a "perverse" discipline in the sense that it seems to be exhaustive: the map informs, provided that you have a certain level of culture, knowledge, and references that need to be known. However, the map cannot tell a person everything about everything in a single image. It offers a point of view that needs to be contextualized if we want to be sure that the public is aware of all of the issues being raised. Data and information, and their transformation into a visualization, can be dramatically different according to the point of view that we choose to emphasize or stress.

What should we do, for example, if we would like to produce a map of Jerusalem? What are the choices available to us? The first option would be to draw a map of the urban structure that shows the different neighborhoods, but on which the green line (the cease-fire line) has unfortunately disappeared. This may suggest that different communities live side by side, equally in harmony in a united city. The various areas of the city are labelled 'Jewish neighborhoods' or 'Arab neighborhoods', a term which invites us to think of the city as a simple conglomeration of places, only qualified by the origin of the predominant community living side by side, without any specific problems. The cartographic criteria chosen are only demographic and social.

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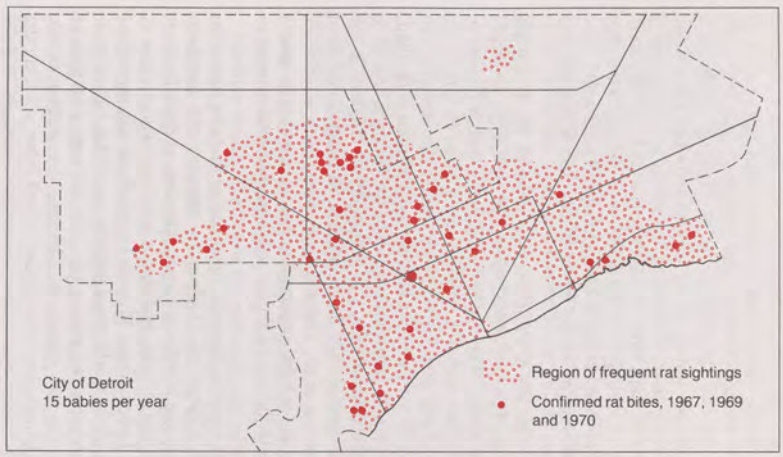
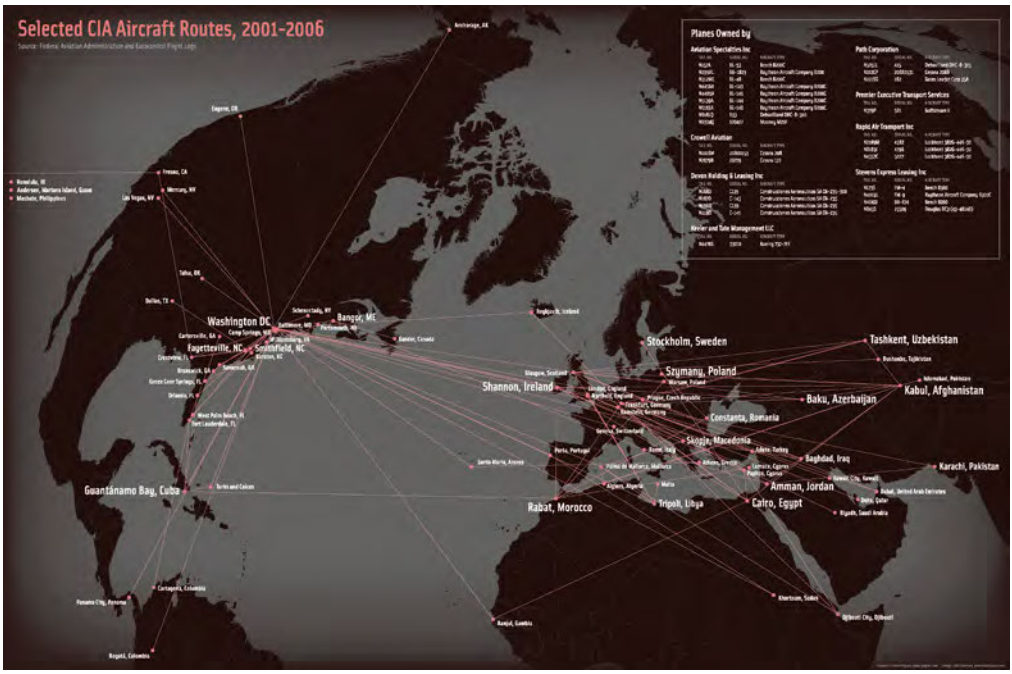


Map 3.16 Region of rat-bitten babies

If a middle-class suburbanite sees a rat in a slum ghetto he may feel disgust, but a slum mother feels horror. The rats – predacious carnivores – are looking for any food to eat, be it garbage or her infant's toes, fingers and nose. In New York City there are an estimated 4 million rats, almost one to every person. But in slum ghettos like Harlem there are 20 rats per baby, hunting, hunting.

Source: Detroit Department of Health, 1967, 1969 and 1970.

● FIG.3 ▶ "In some parts of Detroit, babies are frequently bitten by rats", by William Bunge. Map published in "Nuclear War Atlas", Oxford, Basil Blackwell, 1988.



● FIG.4 ▶ Trevor Paglen et John Emerson, Selected CIA aircraft routes, 2001-2006, 2006.

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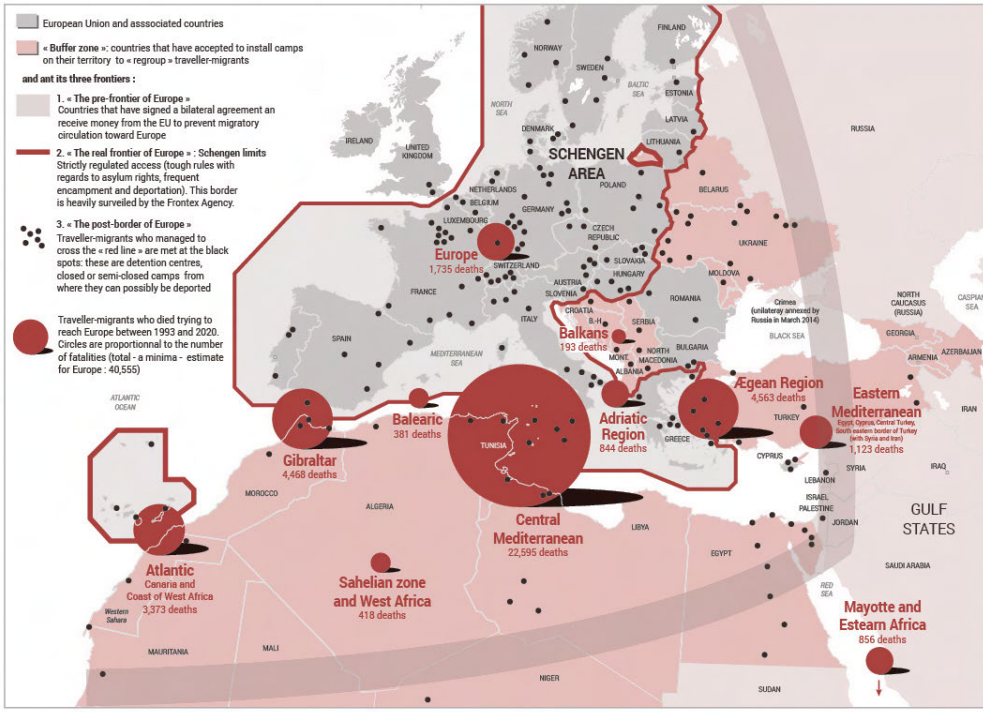

● FIG.5 ▶ Philippe Rekacewicz: "Europe's three frontiers", 2021, Musée de l'immigration, Paris.

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A second option would be to approach the cartography of Jerusalem through the prism of political and geopolitical criteria. This would make it possible to show that there is a divide (the cease-fire line) which represents the international border (in the absence of a definitive settlement for the Israeli-Palestinian conflict), with an Israeli western part and a Palestinian eastern part, and overall that Israel is illegally occupying and colonizing the city's whole eastern part. What the first map simply called "Jewish quarter" becomes an "illegal Israeli settlement under UN resolution 242", which naturally gives it a very different signification. This shows that maps are created and produced with data, with a clear intention in mind, and are based on a set of chosen criteria. A few years ago, when in discussion with an Israeli settler on the top of a hill in the West Bank, I asked how he considered the relationship with the Arab villages surrounding the Israeli settlements. He just answered:

> "You see established Arab villages, and what I see is only a few Arab temporary installations, therefore I can't answer your question."

Another example shows how the use and the treatment of the same data and information could give opposite feelings and misunderstandings, depending on the narrative that the author decides to associate therewith.
Mapping migratory flows remains a real challenge. The maps of migrations in Europe and its adjacent regions was first drawn in 2003, thanks to the work of Olivier Clochard from the collective Migreurop. ○ We update it regularly and, alas, every time we have to add more black dots and draw the red circles even bigger. On 1st January 1993, Gerry Johnson was found dead. A citizen of Liberia – a country devastated by bloody civil war at the time – Johnson had suffocated in a freight train in Feldkirch, Austria. On 3rd May 2020, Ahmed Mahmoud Omar, an Iraqi-Kurd citizen had been killed by a guard in a camp in Bosnia-Herzegovina.

FIG.5

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Between these two dates and these two places, more than 40,000 other migrants (a conservative estimate for this unknown slaughter) have lost their lives trying to reach Europe. They died while trying to leave too, like Marcus Omofuma, a Nigerian murdered in 1999 by three sadistic Austrian policemen when he was being forcibly repatriated.

From Nouakchott to Tripoli, Europe has equipped itself with three frontiers: in the middle of the desert there is the "pre-frontier" of migrant camps and police checkpoints, where people are first turned away. Then there is the actual border, which is more deadly. Those who manage to cross the red line that meet along the black spots, the detention centers of the "post-frontier". Looking at the figures, we might think that human migration toward Europe is so huge that it represents a real threat of invasion by people from poor countries or countries at war for rich countries, or that we find ourselves at the edge of a major "crisis of civilization". This posture would allow us to put the blame on migrants and clear European politicians of any responsibility for having implemented the closure policy throughout the European territory.

Conversely, one could also consider that this political Europe, by closing its borders to human circulation (2.5 million migrants at the most during the past few years out of 530 million inhabitants, around 0.5%) is completely failing to give an appropriate and humane response to welcoming people from highly vulnerable situations and is violating its international commitments (all conventions and agreements concerning refugee protections) by rejecting this population. We could, therefore, call it "political Europe's failure" or a "European political crisis" which would allow us to blame European institutions and to clear the migrants of being guilty of "invading" a territory on which they have two fundamental rights by international law: the right to access a safe place to be protected, and the right to seek asylum in the welcoming countries... One

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map, two worlds! These very different points of view feed the debates and force us to continue to find the best arguments and criteria to support the approaches that we think are the most humanly appropriate.

The angle chosen to depict any situation is not generally a coincidence. We have chosen it on purpose because we have an opinion, a posture, a belief, and because we want to stress some particular aspects of a problem according to the way that we interpret it. We cannot be objective; the political and geopolitical geography is the result of multiple historical choices that leads to the "production" of a particular landscape rendered on the map in a subjective way.

PRIOR TO THE MAP IS THE SKETCH, AND PRIOR TO THE SKETCH IS THE INTENTION

The transformation of data into a graphic and symbolic semiology necessarily induces choices that make the map even more subjective, as much as one can give social and political meanings to shapes and colors! The "means of art", which include symbols, forms, color, contrasts, dynamic, movements, shadows, textures, thinness, thickness (of lines), etc. definitely give an impression and dress the map with a particular atmosphere that influences the audience. This is why a map or a visual representation is much more than a simple image and should be considered as an almost "designed narrative". Maps might be something that serves much more than a simple illustrative purpose. In fact, behind each of these visualizations lies an intention, (a "cartographic intention") that could possibly be the base – the departure point – for a debate, future research, or analysis. Eventually, the key, the legend, and the careful choice of terminology and wording used becomes fully part of this subjective apparatus and reinforces the highly subjective nature of visual representa-

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tion of data and information. We must remember again that nothing that is written in a map is a coincidence or oversight.

Following on from this reflection about the map's subjective nature, we need to tackle and say a few words about the cartographic creation process and what prefigures cartographic representation. Two art specialists – Marie-Haude Caraës and Nicole Marchand Zanartu – have produced a fantastic book called "Images de pensée" (Caraës/Marchand Zanartu 2011) which one could translate into "mapping ideas", although a literal translation would be closer to "image of (my first) thought" or "the very first concrete image or drawing I can do out of what I have in mind". The very first sketch, the one that comes directly to mind, from the mental image, is really the core act of cartographic creation; it is the very essence of the map!

The discipline of cartography, therefore, uses drawing and the means of art and graphic design as its primary means of expression (using data that has been produced scientifically – or not!). The sketch, the drawing, then becomes the direct expression of thought, the drawn metaphor of the soul and spirit. One might be very surprised to learn that even in this century, which is so technological and digital, that many cartographic designers, geographers, artists, illustrators, architects – either radical or not – have decided to go in the opposite direction and rehabilitate the very traditional form of art to express their ideas, convey their messages by just simply "drawing" and producing hand-drafted maps and illustration.

There is a variety of reasons that could explain this trend. Firstly, whatever you think, whatever you do or represent, almost all creation is derived from drawing. One always sketches the ideas before starting the production of an artwork, or before engineering an object. "At the origin of things, there is always a drawing"; this quote from the artist and photographer Philippe de Jonckheere (1964-) during an interview in June 2011 in Paris says it all.

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Secondly, the move towards the digital cartographic production has been an impoverishment in recent decades, due to the very easy accessibility of base maps and library of symbols (which has led to a certain laziness from designers, given that it is so easy to assemble pre-existing elements). This has resulted in very standardized production.

Thirdly, maps have been missing some kind of humanity, and color pens, oil pastels, or aquarelle apparently help to rehabilitate the emotion within the map, putting human beings back in the center of the map, giving them the main role once more, and preventing humans from vanishing under facts, statistics, and context.

Fourthly, sketching involves making more legitimate the possibility of being imprecise, the vagueness, or inaccuracy involved so that it becomes part of the message, highlighting more processes and territorial strategies rather than the very precise, exact location of elements (which does not really make much sense in the context of political cartography). The rehabilitation of the map's imprecision in a world of paranoid desire for precision, in a world in which we want everything to be sorted, organized, and in place is a real "improvement" for a discipline that aims to deconstruct the social and political world to better describe and explain it.

The fifth and final reason lies in the fact that the world that we are mapping is moving fast, constantly evolving, and it is always rather difficult to capture an image fast enough so that it remains up to date. Eventually, the hand-drafted maps symbolize a world in perpetual motion. We are only catching part of this movement, and we express the fact that it may be a different picture tomorrow, next month, or next year. It is an act of modesty, in a way; we know little, and we do not wish to set in stone a situation about which we have too little knowledge. We just give an approach, we give the terms of the debate, and we ask the question. The sketch looking "unfinished" is

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an open door, a message saying: “we offer you an image of today, but things will change into something different, and this is why we can only offer a draft at the moment”.

→VIDEO LINK

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BIOGRAPHIES

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● BUREAU D'ÉTUDES
is a French conceptual art group that was founded in 1998 by Léonore Bonaccini and Xavier Fourt. The group has developed research on the structures of power and capitalism for the past 20 years (www.bureaudetudes.org). The group now lives in the countryside and works on a scale 1:1 collective project across agriculture, commons, and resymbolizing research (www.fermedelamhotte.fr). Bureau d'études is a co-founder of both the 'Laboratory Planet' collective and journal (laboratoryplanet.org) and the 'Aliens in Green' project (aliensingreen.eu), a participatory action project that combines hands-on DIY science protocols, xenopolitical role play, and queering rituals.

● ULRIKE FELSING
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Baur, R. & Felsing, U. (2019). "On the Cultural Anchorings of Knowledge Visualization", in: *Design Issues, – MIT Press Journals*, 35/1, 52-66. https://doi.org/https://doi.org/10.1162/desi_a_00520

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● SEVERIN HALDER
is an activist and geographer driven by experiences with everyday resistance in the peripheries of places such as Rio de Janeiro, Bogotá, and Maputo. Those inspirations guided him through the last decade while working within kollektiv orangotango, community gardens, and academia in and beyond Berlin. He holds a PhD from the Freie Universität Berlin, worked at the Humboldt Universität, and taught at various universities on topics such as critical cartography, political (agro)ecology, and action research. He is currently tracking the evolution of 'This Is Not an Atlas' as an ongoing transnational project with fellow counter-mappers and working on a global visual handbook of anti-authoritarian counter-strategies.
→ He is co-editor of
kollektiv orangotango+ (2018). "This Is Not an Atlas: a Global Collection of Counter Cartographies." Bielefeld: transcript. https://doi.org/10.14361/9783839445198

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is curator at HeK Basel. He studied art history and philosophy at the University of Geneva and completed his PhD at the University of Zurich. He edits the Italian pages of Kunstbulletin and he regularly publishes on contemporary and

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media art. Curated shows include *Entangled Realities – Living with Artificial Intelligence* (HeK, Basel, 2019), *Future Love. Desire and Kinship in Hypernature* (HeK, Basel, 2018), *Grounded Visions: Artistic Research into Environmental Issues* (ETH, Zurich, 2015-2016), *Hydra Project* (Zurich and Lugano, 2016), *Anathema* (Fri-Art, Fribourg, 2007-2008), and Mutamenti (Bellinzona, 2007). His book *Confronting the Machine* (Berlin/Boston: de Gruyter 2017) examines the traditional narratives that relate artistic production to technology and society, while offering an unconventional perspective on digital art. Some of his recent publications include: "Building New Paradigms – A Brief History of Artificial Intelligence and Art" in *Entangled Realities* (Basel: CMV 2019), "Alternative Visions: Human Futures" in *Transdiscourse 2 – Turbulence and Reconstruction* (Berlin: De Gruyter 2016), "Beyond Mere Tools" in *Political Interventions*, Edition Digital Culture 1, (Christoph Merian Verlag and Migros-Kulturprozent, 2014) and "Hackteria: An Example of Neomodern Activism" (Leonardo Electronic Almanac Vol. 20, Issue 1, 2014).

● PHILIPPE REKACEWICZ

is a geographer, cartographer, and information designer. After earning his degree in geography from the University of Paris 1 (Panthéon-Sorbonne), he worked at Le Monde diplomatique from 1988 to 2014. Between 1996 and 2008, he jointly headed the cartographic department of GRID-Arendal in Norway, a delocalized office of the United Nations Environment Program (UNEP). He is a specialist in both geopolitics and international relations. His interests include questions relating to migration, refugees, forced displacement of populations, and borders. He co-founded the participatory research website visionscarto.net with Philippe Rivière in order to bring these research studies together. The website is dedicated to radical and experimental cartography and geography and is focused on social and spatial justice and competing fights between public and private spaces. In January 2017, he embarked into the program "Crosslocations" at the University in Helsinki's anthropology department as well as the program "Territories of urban extension" at the ETH – University of Zurich.

→ He is the author of

Terrorisme, insurrection ou résistance : cartographier et nommer «l'internationale djihadiste» https://visionscarto.net/djihadisme-international, juin 2015, visionscarto.net

Atlas du monde diplomatique, "Mondes émergents" Nouvelle édition entièrement refondue, Paris, Mars 2012 (Philippe Rekacewicz dir. in collaboration with Alain Gresh, Olivier Zajec et Catherine Samary).

● BIRGIT SCHNEIDER

is professor for knowledge cultures and media environments at Potsdam University, Germany. She studied art and media studies, as well as media art and philosophy in Karlsruhe, London, and Berlin. After initially working as a graphic designer, she worked at the research department "Das technische Bild" at the Humboldt University in Berlin from 2000 to 2007, where she received her doctorate with a thesis on the digital history of textiles. Since 2009, she has been researching in the context of fellowships at the European Media Studies Department of the University of Potsdam as well as in Munich, Weimar, and Cambridge, UK. In 2010, she represented the Chair of History and Theory of Cultural Techniques at the Bauhaus University Weimar. She has been Professor of Media Ecology in the Department of European Media Studies at the University of Potsdam since 2016. Her current research focuses on images and perceptions of nature, ecology, and climate change, diagrams, data graphics, and maps as well as images of ecology. She is head of the mixed-methods project "analyzing networked climate images", co-speaker of the "Network Digital Humanities" of the University of Potsdam, and a member of the research group "Sensing. On the knowledge of sensitive media".

→ She is the author of

"The Technical Image" (Cambridge 2015) and "Image Politics of Climate Change" (Bielefeld 2014) and the German monographs "Textiles Prozessieren" (Berlin, 2007), and "Klimabilder" (Berlin 2018).

● CHRISTINE SCHRANZ

is a designer and holds a PhD in Spatial Design from the University of Vienna, in cooperation with the Zurich University of the Arts. She is Head of the Research Program at the Institute Contemporary Design Practices at the Academy of Art and Design FHNW in Basel. Currently she is leading a four-year research project funded by the Swiss National Science Foundation (SNSF) on "Commons in Design. Open Source and Open Design in Contemporary Design Processes", which investigates the foundations of commons-based design and the changing self-image of designers in the context of digitalization, with specific research on gender, space and working environments. Other research activities include fellowships at the Archaeologies of Media and Technology (AMT) research group at the Winchester School of Art – University of Southampton (2017) and the Chair of Art Theory & Curating at the Zeppelin University in Friedrichshafen (2013/15) as well as a doctoral fellowship at the Chair of Visual Arts at TU Berlin (2011/12).

Christine studied Scenography (MA) and Visual

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Communication (diploma degree), both at Zurich University of the Arts.

→ She is the author of

"Augmented Spaces and Maps. Das Design Von Kartenbasierten Interfaces." (2020). Berlin, Basel: Birkhäuser. https://doi.org/10.1515/9783035620252-fm

"Commons for Mapping: How Social Computing Changes the Design of Interfaces." In *Interface Critique Journal* Vol.1, Florian Hadler, Alice Soiné, Daniel Irrgang (Eds.) (2018) 168-175. DOI: 10.11588/ic.2018.0.44740 This article is released under a Creative Commons license (CC BY 4.0).

● PAUL SCHWEIZER

is a geographer and popular educator. He has studied youth cultures in urban peripheries of cities such as Naples, São Paulo, and Istanbul. As a member of kollektiv orangotango, he co-conducts collective art projects in public space. He co-edited 'This Is Not an Atlas' and curates the notanatlas.org platform. Currently he co-organizes collective mapping processes in Europe and Latin America in order to facilitate a global dialog of critical cartographies. His ongoing interests lie in developing decolonial mapping methodologies that embrace diverse forms of (not-)knowing.

→ He is co-editor of

kollektiv orangotango+ (2018). "This Is Not an Atlas: a Global Collection of Counter Cartographies." Bielefeld: transcript. https://doi.org/10.14361/9783839445198

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II
SHAPING THE INVISIBLE WORLD

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Introduction to the Exhibition

STRATEGIES OF NEOGEOGRAPHY IN RECENT MEDIA ART

by Boris Magrini

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COUNTER-MAPPING AND MEDIA ART

The exhibition Shaping the Invisible World takes a look at contemporary artists' use of cartography as a tool by which to reveal the world's hidden realities, be they geographical, political, or social. The exhibition stems from the desire to examine how recent artists have managed to combine a poetic approach with a critical discourse regarding the practice of cartography, particularly cartography that uses digital tools. The origins of the exhibition were, first and foremost, the various practices known as counter-cartography or critical geography, studied in particular by the exhibition's co-curator Christine Schranz in her research (Schranz 2020). Geographers and researchers have revealed the subjective and partial character of every map since the second half of the 20th century, underlining that every representation of the world, or part thereof, can actually be manipulated in order to satisfy the economic or political interests of those who finance and promote such initiatives.

A science that has its origins in antiquity, cartography has been a tool of power for many years, as has been well demonstrated by Jerry Brotton, for example, in his popular book that traces the history of cartography (Brotton 2013).

Both the criticism of prevailing geographic and cartographic research and the desire for alternative, bottom-up, and collaborative approaches to visualizing local realities have given rise to a movement that is generally referred to as critical or counter-cartography. This movement uses the practice of creating alternative maps or questions traditional representations of geo-political realities. We might consider geography to not only concern the description of territories, but also that which involves the study of the set of social, political, and economic events that take place in certain territories. A critical approach to this phenomenon involves a questioning of traditional geography and of both the methodology

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and the tools used to analyse socio-political and economic contexts by the establishment.

Cartographic tools themselves, as well as data visualization methodologies, have also changed profoundly in recent decades. A great change has taken place in this field with the advent of digitalization and interconnectivity. Geographic Information Systems (GIS), the Global Positioning System (GPS), and the development of high-resolution satellite imagery have all revolutionized the representation of the world and the study of geo-political realities. If these technologies have allowed for a democratization in the exchange of information and in the creation of maps and representations of the world and its realities, then they have also placed these tools in the hands of a few private companies.

It is precisely in the analysis and questioning of these tools, tools on which contemporary cartography is based, that the artists in the exhibition Shaping the Invisible World base their works, rather than critiquing cartography itself as a science. It is no coincidence that the artists who are most interested in spatial representation and data visualization today will usually have their work be accompanied by a reflection on the problem of the monopoly of digital data, the question of displaying sensitive data, the existence of little-known satellite systems, or the use of data collected from alternative sources. A critical and distrustful spirit towards the authorities who have a monopoly on today's cartographic tools, be they political, academic, or corporate, has now become the dominant attitude on the part of artists who can be associated with both the methodology and, above all, the ideology of counter-cartography.

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QUESTIONING TRADITIONAL CARTOGRAPHY

The concepts of critical cartography and counter-mapping have revolutionized our way of thinking, reading, and creating representations of geo-political information. These movements have refused to consider map-making – and any other representation of the world and its realities —as a univocal and objective science. This does not mean that they reject its usefulness, quite the contrary, but they do claim that each map shows only a partial reality, insisting that different maps can and should be created in opposition to one-sided representations.

The main figures of this critical stance have revealed the limits of traditional geography. In a paper originally published in 1971, the famous geographer David Harvey affirmed that: "There is a clear disparity between the sophisticated theoretical and methodological framework which we are using and our ability to say anything really meaningful about events as they unfold around us" (Harvey 2016: 17-18). Harvey asserted the need for a revolution in the science of geography on the basis of this exact discrepancy, between the academic tools of analysis of the world and the need to intervene in the world. Following that particular train of thought, geographer and cartographer John Brian Harley not only stressed the always-subjective nature of any geographical survey, but also how it is often driven by opportunistic interests and as a means for the ruling authorities to justify their actions. According to Harley, cartography is an elaborate fiction, one developed and maintained by those in power in order to control and subjugate minorities: "Maps are preeminently a language of power, not of protest" (Harley 2002: 79).

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The criticism advanced by those involved in counter-mapping approaches has made it possible to question the institutions that produce mapping tools and the prejudices that are involved in both the creation and distribution of information. Moreover, it has allowed the development of new, more democratic strategies for the representations of the world. These new ways of making cartography, understood here in full, involve the potential visualization of processes that are either rarely explored or the visualization of processes that are known, but which need to be expressed with alternative points of view.

DIGITAL TOOLS AND NEOGEOGRAPHY

Without any doubt, digital tools have paved the way for the development of cartographic research outside the traditional fields dominated by the state, academia, and private companies. This has resulted in a multiplication of individual initiatives that are often labeled as 'experimental geography', as exemplified by the many projects collected in a book edited by Nato Thompson, Jeffrey Kastner, and Trevor Paglen (Nato/Kastner/Paglen 2008), or in the equally compelling work published by Janet Abrams and Peter Hall (Abrams/Hall 2008). This phenomenon can be partly linked to practices developed by artists who make creative use of tools such as GIS, GPS, and satellite imagery.

The concept of experimental geography, or neogeography, has often been used to describe Trevor Paglen's approach, who has developed his artistic work on the basis of the use of methodologies and tools that are close to geography, but which are used for alternative purposes. For instance, his well-known Limit Telephotography series, which shows otherwise inaccessible buildings through the use of extremely powerful telephoto lenses. Paglen combines strategies of observation of the territory – or in this case through methodologies that are akin to astronomical observation – with a critical discourse of institutions of power, such as military or

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surveillance buildings. His project, The Other Night Sky, conversely, uses data collected by an international public of amateur satellite observers to calculate the orbits of satellites and to photograph them.

Reflections on the putting into orbit of satellites to reveal territorial data, a phenomenon that has revolutionized the practice of cartography, is also found to occupy the center of the work of artists such as Quadrature and fabric | ch. Both of the aforementioned artists create works that make visible the existence of satellites, their trajectory, and their activities. With their works, the artists make us aware of the massive presence of these instruments in orbit, whether they are satellites used for the operation of GPS, for the observation of atmospheric and ecological phenomena, or if they are satellites that are used for military purposes. Quadrature's Supraspectives and Satellite Daylight by fabric | ch raise questions about the problem of surveillance, but moreover about the hegemony and the use of data that these systems generate.

James Bridle is equally well known for his research into digital tools related to land observation or to navigation, such as GPS, geolocation software, drones, and surveillance cameras. His critical view of technology, and the need to develop a greater level of technological literacy among the population, was emphasized in his famous publication New Dark Age (Bridle 2018). His interactive Rorschmap and Roschmap Street View allow kaleidoscopic compositions to be created from online digital Google maps. The artist exploited this approach again in his work Catch and Release, which raised the issue of generating big data in the study of biological and ecological phenomena, among flamingos in his specific case. The artist had access to the Tour du

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Valet's huge database, which includes sightings of over 600,000 individual birds. The artist emphasizes the intricate problem of collecting, visualizing, and making sense of data in the study of complex phenomena by combining satellite images with sentences from the database.

ALTERNATIVE MAPS AND VIRTUAL WORLDS

While the digital tools used for data collection and visualization have had an important impact on the practice of cartography, an equally fundamental paradigm shift has taken place with regards to the consideration of the objectivity of each data visualization. Laura Kurgan, who is both an artist and an exemplary data visualization researcher, stresses the subjective character of each map, stating that, “The spaces that maps try to describe can be ideal, psychological, virtual, immaterial, or imaginary - and they are never just physical” (Kurgan 2013: 16). She concludes that, “we need to learn how to agree and disagree with those arguments, to challenge the interpretations made of images that are anything but objective or self-evident” (Kurgan 2013: 26). Laura Kurgan’s work is a renowned illustration of the integration of counter-cartography into an artistic context and she has had a significant impact on many artists who currently adopt similar strategies. Kurgan’s maps are an example of how a critical and creative use of data analysis and visualization tools allows for a different reading of social and political realities.

Similarly, the artists’ group bureau d'études (Léonore Bonaccini and Xavier Fourt) has created a multitude of alternative maps in order to make visible the political and, above all, the economic realities linked to capitalist and colonial market logics (Holmes/Lomme/bureau d'études 2015). Both Kurgan and bureau d'études have shown how the exercise of visualizing data, which is already known but which is organized differently from the dominant discourses,

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enables a different understanding of the realities that are being analyzed and illustrated.

Artists such as Kurgan, bureau d'études, and many others among whom we might mention Forensic Architecture, have succeeded in developing cross-cutting projects that are exemplary for several reasons: they use a transdisciplinary approach to create visualizations and analyses of phenomena that would remain largely overlooked or which would be analyzed in an unfair and discriminating way by the regimes in force in the places studied; they use a typical counter-mapping approach because they exploit data collected not just by the authorities, but also by the population; finally, they all synthesize scientific rigor and artistic language in order to reach a wider audience. Put otherwise, their analyses become objects of aesthetic-artistic contemplation and, thus, assume an emblematic and moral level that goes beyond the specificity of the events discussed. These strategies underline how the adoption of neogeography or counter-cartography research in an artistic context can be not only satisfying from an artistic point of view, but also from an informative, epistemological, or even a political one. Many theorists have questioned traditional geography and stressed the importance of alternative forces in the construction of the representation of the world. Artists, in turn, appropriate counter-cartography strategies, even though they often do not work in a strictly scientific or academic field, and can certainly contribute to the different construction of a representation of the world. In this sense they operate as neogeographers.

An example of a freer, but equally compelling approach, is that of the artists Esther Polak and Ivar Van Bekkum who appropriated Judith Butler's concept of performativity of genres and Speech Acts from the philosophy of language and applied these concepts to their investigations of the territory and urban spaces. Their approach has been exemplified through their workshops City as Performative Object, but also in the 'Walking Essay' by Esther Polak

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through Google Earth (Polak/Van Bekkum 2017). They have produced several videos using Google Earth and Google Street View, often combining their recordings with tools such as GPS and binaural microphones. Google Maps is now among the most widely used but also discussed and criticized GIS and web mapping tool. In their work, which makes a creative use of Google Maps and Google Earth, Esther Polak and Ivar Van Bekkum skilfully mix geolocation tools, GIS, and web mapping to develop a reflection on the inhabitation of public space, the question of privacy, but also the discrepancy between the lived reality of a place and its digital representation. If Google Maps is still criticized for its monopoly on web mapping, and for the fact that the process of mapping and data collection is not fully transparent or publicly accessible, this means that the majority of today's population use a tool whose accuracy or correctness in the data creation process cannot be verified. Google Maps presents further problems related to the fact that it is proprietary software – contrary to open-source projects such as Open Street Maps – and to the fact that it tracks the user's history. The works by Esther Polak and Ivar Van Bekkum that do make use of Google's various web mapping and GIS raise the question of the supremacy and integrity of these tools and services.

There are also digital maps beyond these functional tools. Some video games are an example of software offering digital recon-

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structions of entire cities. Can we consider such software, even though it was created for entertainment purposes, as digital maps? Is the question of whether they are accurate or not a relevant one in such a recreational context? The artists Total Refusal (Robin Klengel & Leonhard Müllner) have created a performance within the virtual world of The Division (Ubisoft, 2016). The online video game presents a realistic and detailed digital reconstruction of Manhattan, evidently adapted to the post-apocalyptic scenario of the video game. The artists coordinated a tourist walk named Operation Jane Walk – inspired by the worldwide series of Jane's Walk city tours – in order to discuss the urban planning and building choices of the virtual universe. After all, if millions of people play these games every day, immersing themselves in digital reconstructions of existing cities, their experience of the virtual spaces partly replaces the real experience. The question of who is responsible for how this experience is represented may be as important as the question of how Google Maps retrieves and calculates the data on which it bases its web mapping.

The Artist Fei Jun has gone one step further, creating an interactive game in which the public can even build fictional worlds from ordinary objects rendered in 3D. In his installation Interesting World, users can not only create their own worlds, but also visit and modify other users' creations. With this work, the artist underlines the idea that the representation of a world is always an exercise in negotiation between various points of view.

These examples show that critical geography is a territory that lends itself to exploration, not just by scientific researchers and geographers, but also by artists and people from different horizons. If it is true that cartography is not simply an act of reproducing the world, but also an act of modeling perceived realities, then artists must contribute to the construction of such a world. Artists manage to propose representations of the world that are nevertheless essential for an equally critical discourse on existing realities through a freer and more creative approach.

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ECOLOGICAL ACTIVISM, FICTIONAL SCENARIOS, AND ARTIFICIAL INTELLIGENCE

The term counter-mapping is often associated with revolutionary, bottom-up projects, produced by NGOs opposing the maps produced by authorities who often pander to the economic interests of multinationals. Counter-mapping projects often have an ecological reason and purpose. It is no coincidence that the struggles for the recognition of environmental catastrophes go hand in hand with the work of visualizing such disasters. If those responsible for the damage caused to the land or to the environment, whether government authorities or private companies, have an interest in concealing or minimizing the data about such damage, then it is often the minorities who have to fight to have the facts recognized. Counter-cartography and ecological activism, therefore, naturally stand together.

In this respect, the work of Persijn Broersen & Margit Lukács is particularly interesting. Their video Forest on Location and video sculpture Shvayg Mayn Harts are both a documentation and a memorial of the Białowieza forest in Poland, a national park. The site has also been a UNESCO World Heritage Site since 1979. Although the forest is a protected heritage site, the Polish government approved the logging of trees, justified by the presence of a parasite. The Białowieza forest, which the artists recorded by means of photogrammetry and reproduced by means of a video, a 3D reproduction of a trunk, and then combined with a popular song performed by the Iranian singer Shahram Yazdani, becomes the territory in which issues are confronted. These issues include the opposition of cultural and economic interests, the need to preserve a territory and its biotope, and profit-making through deforestation operations.

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Both the visualization of macroscopic environmental problems and the visualization of microscopic phenomena, such as the problem of air pollution, can be part of a mapping project of the territory, as the work of Studio Above&Below (Daria Jelonek and Perry-James Sugden) demonstrates. The artists make use of augmented reality to render visible the imperceptible changes in air quality in different environments. The use of AR technology seems particularly effective in conveying information with an intuitive real-time visualization process in their installation Digital Atmosphere.

Virtual reality, rather than augmented reality, is the technology used by Jakob Kudsk Steensen to address issues of land representation and environmental challenges in his installation Primal Tourism. Using digital tools, but also multiple cartographic sources and historical documents, the artist has faithfully reconstructed the island of Borabora, but introduces a science fiction scenario, namely the vision of a future in which global warming has partially submerged the island, making it uninhabitable. The possibility offered for the user to explore the island in a virtual universe, but also to learn about its history through interactive documents scattered in the corners of the island, is in the end another example of possible counter-mapping, realized here with cutting-edge technology. The science-fiction scenario clearly compromises the reading of this impressive digital map as a reliable tool, but at the same time extends the concept of data interpretation, which also occurs in the most rigorous cartography, as mentioned previously. The artist emphasizes the subjective character of digital tools in specific in order to investigate the

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effects of digitalization on our perception of nature and on our understanding of geopolitical constructs

An only seemingly more objective speculation of future scenarios is proposed by Tega Brain, Julian Oliver, and Bengt Sjölén in their work Asunder. They programmed a supercomputer with a machine learning-based software for the prediction and resolution of future climate catastrophes. Once again, the visualization of future data combined with the production of fictional maps is an exercise that extends far beyond the usual counter-mapping practices. The work is, in fact, an ironic commentary on technological solutions to environmental problems.

The examples proposed in the exhibition Shaping the Invisible World illustrate this freer and yet no less important approach. Artists demonstrate that a map is never an exact replica of the reality being represented by assuming the freedom to exploit digital tools for the representation of the world, or a part thereof, or even to create fictitious representations. Nevertheless, this representation is an equally necessary vehicle for the discussion of facts.

SHAPING THE INVISIBLE WORLD

The exhibition Shaping the Invisible World brings together a selection of artists who exemplify the recent assimilation of ideas and strategies from counter-cartography to neogeography. The artists' work can be defined as an attempt to develop a fragmentary, but still free and liberating, view of the world. These artists create different narratives and question the representations defined by conventional, authoritarian, governmental, or dominant private companies. What also distinguishes them is the use of different technologies and different tools of representation, including augmented reality, virtual reality, artificial intelligence, and interactive video games. However, as Laura Kurgan has pointed out, "there is no such thing as raw data" (Kurgan 2013, 35), there is no such thing as an objective representation of the world because the collection of any

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kind of data is already an interpretation. Hence, the work of artists who collect, create, and arrange new data to form a partial illustration of the world can be regarded as a valid contribution to the representation of the territory and of its multiple realities.

As a closing remark, we can conclude that the feeling of distrust towards the dominant authorities responsible for the existing tools of representation and geo-political analysis is often shared by artists working in the field of neogeography. Yet, what the artists add to counter-cartography is an alleged freedom in the use of representation tools, not simply in just representing different topics, thereby highlighting hidden realities and visualizing information in a different way. The examples discussed show that artists, thanks to the poetic freedom they have at their disposal, can develop strategies that go beyond the existing possibilities of counter-mapping. The use of performative approaches, the creation of fictitious and virtual universes, or the exploitation of technologies related to digital geography are also examples of practices for a possibly less rigorous, but nevertheless relevant, discussion of geographical issues. The map is a representation of the world; in a broader sense, it is a representation of what is happening in the world, of the population, and its multiple realities. The map is both an instrument of representation and knowledge. It is also the result of an observation, but also a projection and a vision for the future. Through their visionary works, artists who use new media and technologies that

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are close to the tools used in counter-cartography contribute to questioning perceptions of reality that are often the result of manipulation for political or economic purposes. Their contribution is now more necessary than ever, particularly at a time when information control has become a flagrant and perfidious political tool.

→VIDEO LINK

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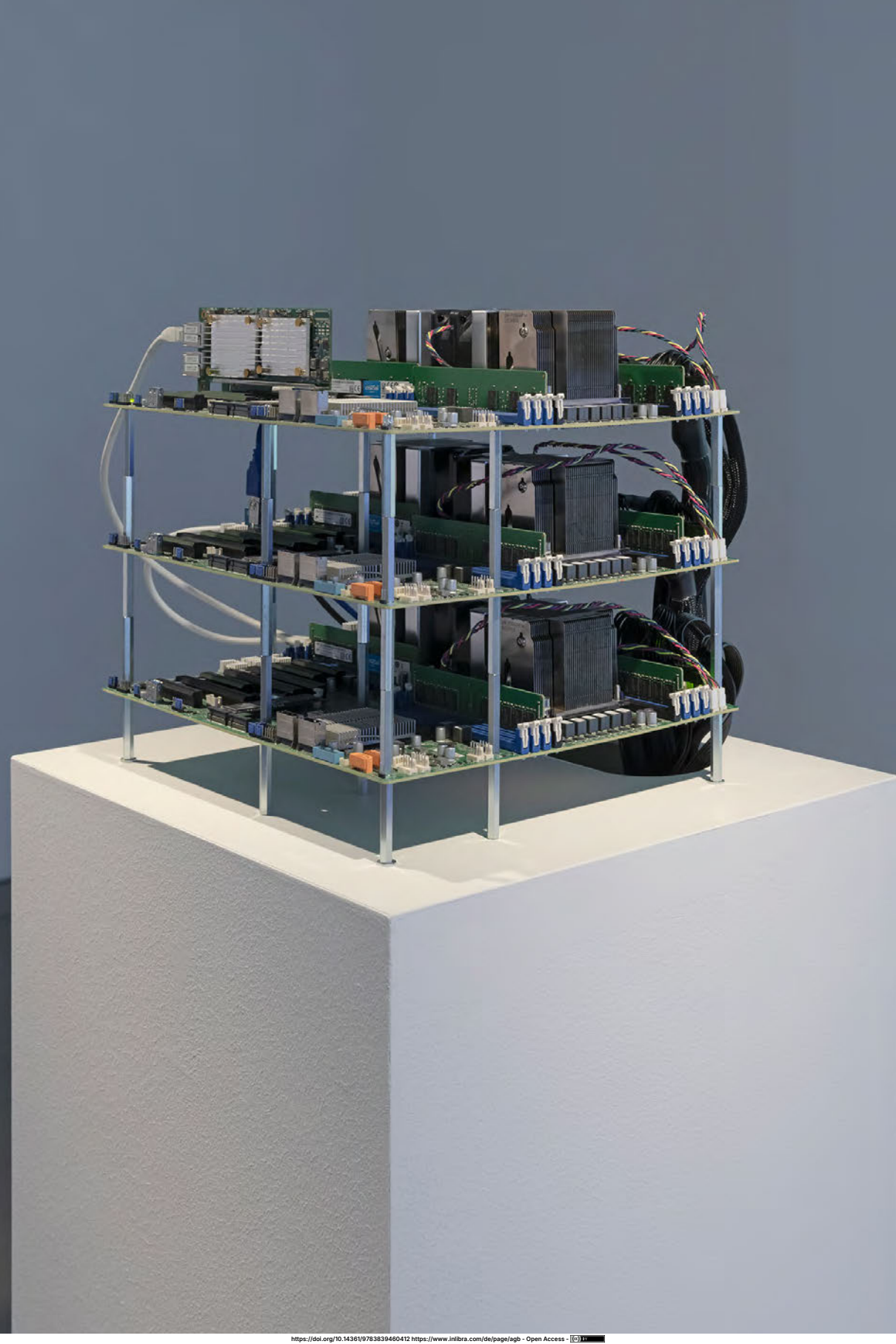

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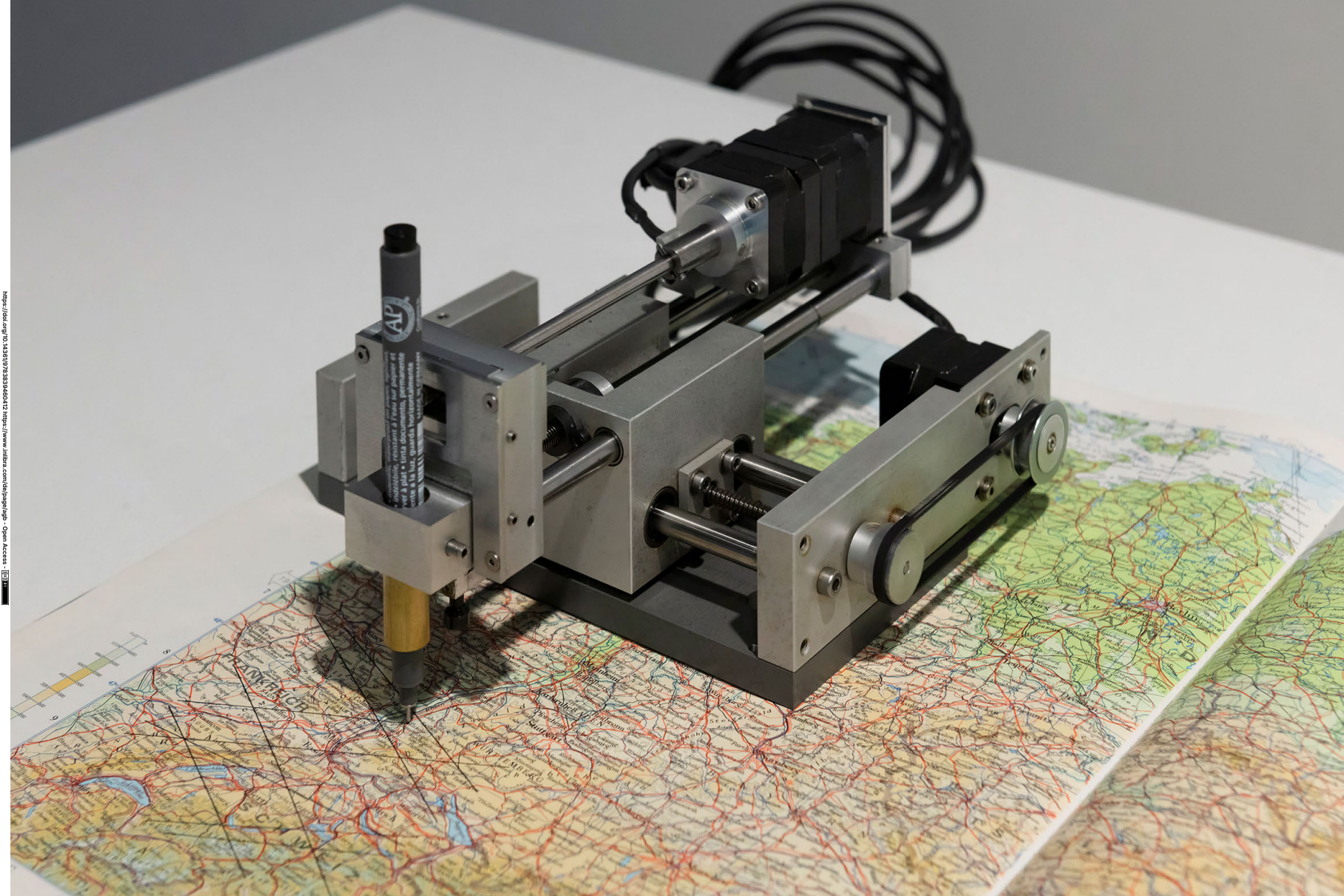

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01

Persijn Broersen & Margit Lukács, Forest on Location, 2020 and Shvayg Mayn Harts, 2018, installation view "Shaping the Invisible World – Digital Cartography as an Instrument of Knowledge", 2021, HeK (House of electronic Arts Basel), Photo: Franz Wamhof

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Tega Brain, Julian Oliver and Bengt Sjölén, Asunder, 2019, installation detail, "Shaping the Invisible World – Digital Cartography as an Instrument of Knowledge", 2021, HeK (House of electronic Arts Basel), Photo: Franz Wamhof

03

Fei Jun, Interesting World installation, 2019, installation view, "Shaping the Invisible World – Digital Cartography as an Instrument of Knowledge", 2021, HeK (House of electronic Arts Basel), Photo: Franz Wamhof

04

Fei Jun, Interesting World installation1, 2019, installation detail, "Shaping the Invisible World – Digital Cartography as an Instrument of Knowledge", 2021, HeK (House of electronic Arts Basel), Photo: Franz Wamhof

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Quadrature, Supraspectives, 2020, Installation detail, "Shaping the Invisible World – Digital Cartography as an Instrument of Knowledge", 2021, HeK (House of electronic Arts Basel), Photo: Franz Wamhof

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fabric | ch, Satellite Daylight, 47°33'N, 2020, installation view, "Shaping the Invisible World – Digital Cartography as an Instrument of Knowledge", 2021, HeK (House of electronic Arts Basel), Photo: Franz Wamhof

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Exhibition view, "Shaping the Invisible World – Digital Cartography as an Instrument of Knowledge", 2021, HeK (House of electronic Arts Basel), Photo: Franz Wamhof

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Total Refusal, Operation Jane Walk, 2018, Installation view, "Shaping the Invisible World – Digital Cartography as an Instrument of Knowledge", 2021, HeK (House of electronic Arts Basel), Photo: Franz Wamhof

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Exhibition view, “Shaping the Invisible World – Digital Cartography as an Instrument of Knowledge”, 2021, HeK (House of electronic Arts Basel), Photo: Franz Wamhof

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Quadrature, Satelliten, 2015, installation detail, “Shaping the Invisible World – Digital Cartography as an Instrument of Knowledge”, 2021, HeK (House of electronic Arts Basel), Photo: Franz Wamhof

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Exhibition view, “Shaping the Invisible World – Digital Cartography as an Instrument of Knowledge”, 2021, HeK (House of electronic Arts Basel), Photo: Franz Wamhof

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Quadrature, Satelliten, 2015, Installation view, “Shaping the Invisible World – Digital Cartography as an Instrument of Knowledge”, 2021, HeK (House of electronic Arts Basel), Photo: Franz Wamhof

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Bureau d‘études / Collectif Planète Laboratoire, Astropolitique, déplétion des ressources terrestres et devenir cosmique du capitalisme: une cartographie, 2019, installation view, “Shaping the Invisible World – Digital Cartography as an Instrument of Knowledge”, 2021, HeK (House of electronic Arts Basel), Photo: Franz Wamhof

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PolakVanBekkum, The Fortune, 2018, installation view, “Shaping the Invisible World – Digital Cartography as an Instrument of Knowledge”, 2021, HeK (House of electronic Arts Basel), Photo: Franz Wamhof

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PolakVanBekkum, The Mailman’s Bag, 2015, installation view, “Shaping the Invisible World – Digital Cartography as an Instrument of Knowledge”, 2021, HeK (House of electronic Arts Basel), Photo: Franz Wamhof

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Exhibition view, “Shaping the Invisible World – Digital Cartography as an Instrument of Knowledge”, 2021, HeK (House of electronic Arts Basel), Photo: Franz Wamhof

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Jakob Kudsk Steensen, Primal Tourism, 2016-2020, installation view, “Shaping the Invisible World – Digital Cartography as an Instrument of Knowledge”, 2021, HeK (House of electronic Arts Basel), Photo: Franz Wamhof

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Trevor Paglen, Circles, 2015, installation view, “Shaping the Invisible World – Digital Cartography as an Instrument of Knowledge”, 2021, HeK (House of electronic Arts Basel), Photo: Franz Wamhof

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Tega Brain, Julian Oliver and Bengt Sjölén, Asunder, 2019, installation viewl, “Shaping the Invisible World – Digital Cartography as an Instrument of Knowledge”, 2021, HeK (House of electronic Arts Basel), Photo: Franz Wamhof

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Studio Above&Below, Digital Atmosphere, 2020, Installation view, “Shaping the Invisible World – Digital Cartography as an Instrument of Knowledge”, 2021, HeK (House of electronic Arts Basel), Photo: Franz Wamhof

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WORKS/ARTISTS IN THE EXHIBITION

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BUREAU D'ÉTUDES

Closer to traditional cartography and counter-mapping are the activities of the French artist duo Léonore Bonaccini and Xavier Fourt, who work under the name bureau d'études. Since the 2000s, they have been producing maps of geopolitical, economic and social situations, which reveal indiscernible dynamics of the capitalist system and colonial logic. Their maps, characterized by a creative use of infographics, are often produced in large formats, and are presented in museums and other exhibition spaces. Astropolitique (2019), their latest map, deals with asteroid mining and shows ongoing research into this a yet theoretical economic model, which is of increasing interest due to the pending terrestrial exhaustion of minerals needed for the production of computers, laptops and tablets. Their map also looks at social and environmental disasters that have already been caused by the extraction of these rare resources on Earth.

BIO The Paris-based artists Léonore Bonaccini and Xavier Fourt form the artist-duo bureau d'études. On the initiative of Ewen Chardronnet and the duo, the newspaper "La Planète Laboratoire" was created in 2007. For the last several years, the French Group has been producing cartographies of contemporary political, social, and economic systems. The visual analysis of transnational capitalism is based upon extensive research and is usually presented in the form of large-sized murals. 'Governing by Networks', a chart produced in 2003, visualizes the mutual involvements and dependencies within global media conglomerates. These visualizations of interests and corporations re-symbolize the unseen and hidden, thereby revealing what normally remains invisible and contextualising apparently separate elements within a bigger whole.

▲ Bureau d'études / Collectif Planète Laboratoire, Astropolitique, déplétion des ressources terrestres et devenir cosmique du capitalisme: une cartographie [2019], print on paper.
Photo courtesy of the artists.

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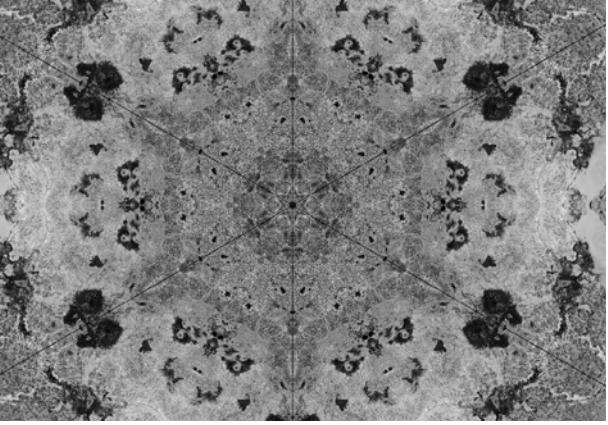

● JAMES BRIDLE

James Bridle uses GPS, geolocation software, weather data collection, public mapping, drones, and surveillance cameras to create their works, which they accompany with a critical perspective on technology. The work Catch and Release (2018) explores the history of radar technology and its current developments, intersecting the history of surveillance with that of bird migration observation. For this work the artist was able to access the vast database of the Tour du Valat (a private foundation working for the conservation of Mediterranean wetlands in France), which contains over 600,000 flamingo sightings. Bridle investigates the tricky challenge of collecting, visualizing and evaluating data in the study of complex phenomena by dramatizing these datasets with aesthetically compelling satellite images. The two-channel installation is connected online to a database on the artist's personal server. One channel shows entries from the bird observation database while the other visualizes the geographical location mentioned in the entry with a kaleidoscopic composition. As a new line of data appears, the last is erased from the work's database.

BIO James Bridle is a writer and artist working across both technologies and disciplines. Their artworks have been commissioned by galleries and institutions and exhibited both worldwide and on the Internet. Their writing on literature, culture, and networks has appeared in magazines and newspapers including Wired, the Atlantic, the New Statesman, the Guardian, and the Observer. "New Dark Age", their book about technology, knowledge, and the end of the future, was published by Verso (UK & US) in 2018, and they wrote and presented "New Ways of Seeing" for BBC Radio 4 in 2019. Their work received an Honorary Mention at the Prix Ars Electronica 2013, an Excellence Award at the Japan Media Arts Festival 2014, and an Honorary Mention at CERN COLLIDE 2016. It was also shortlisted for the Future Generation Art Prize 2014. Bridle won the Design Museum Graphics Design of the Year in 2014.

▲ James Bridle, Catch and Release [2018], two-channel digital installation. Photo courtesy of the artist.

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TREVOR PAGLEN

Trained as an artist and geographer, Trevor Paglen exemplifies the fusion of counter-cartography and art. His photographic series, Limit Telephotography, portrays the location of military bases and industrial complexes that are usually inaccessible due to land and air space restrictions, using techniques and lenses close to those used for astrophotography. Paglen has devoted most of his work to the analysis of the functioning and logic of state surveillance and has collaborated with several other artists and researchers throughout their projects. The video Circles (2015) presented here surveys the surveillance system itself, showing an aerial view of the GCHQ (Government Communications Headquarters) filmed with a drone. The GCHQ, located near Gloucester, is an intelligence and security organization, which provides information to the UK government and armed forces. It has been at the center of controversies related to the abuse of surveillance and security protocols and the disregard of private data.

BIO Trevor Paglen is an artist whose work spans image-making, sculpture, investigative journalism, writing, engineering, and numerous other disciplines. Paglen's work has had one-person exhibitions at Nam June Paik Art Center, Seoul; Museo Tamayo, Mexico City; the Nevada Museum of Art, Reno; Vienna Secession, Eli & Edythe Broad Art Museum, Van Abbe Museum, Frankfurter Kunstverein, and Protocinema Istanbul, and has participated in group exhibitions at the Metropolitan Museum of Art, the San Francisco Museum of Modern Art, the Tate Modern, and numerous other venues. He is the author of five books and numerous articles on subjects including experimental geography, state secrecy, military symbology, photography, and visuality. Paglen's work has been profiled in the New York Times, Vice Magazine, the New Yorker, and Art Forum. In 2014, he received the Electronic Frontier Foundation's Pioneer Award for his work as a "groundbreaking investigative artist."

▲ Trevor Paglen, Circles [2015], video. Photo courtesy of the artist, Metro Pictures, New York, Altman Siegel, San Francisco.

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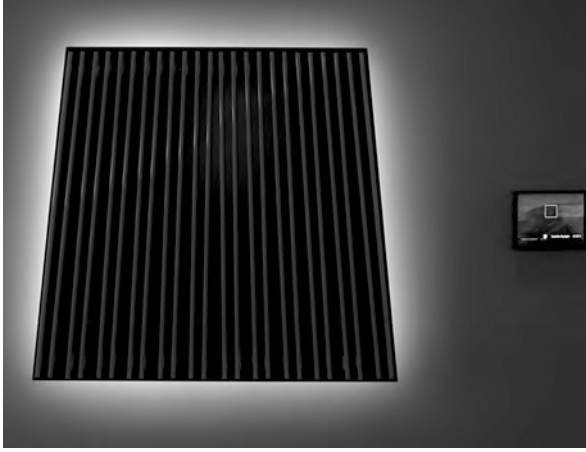

● FABRIC | CH

The studio for architecture, interaction, and research fabric | ch takes a look at the increasingly important presence of satellites. The installation, Satellite Daylight, 47°33'N (2020), simulates light as perceived by a meteorological satellite orbiting the earth and the latitude of Basel at a speed of 7,541m/s. The installation consists of 24 neon tubes that reproduce the meteorological reality perceived by the satellite during its trajectory, depending on whether it is in a sunny, cloudy position, day, or night, all in real time. A screen shows a real-time weather map with the imaginary satellite. Satellite Daylight, 47°33'N draws attention to the existence of weather satellites and their influence on our understanding of the world and living conditions.

BIO fabric | ch formulates new architectural proposals and produces singular liveable spaces that bind localized and distributed landscapes, algorithmic behaviours, atmospheres and technologies by combining experimentation, exhibition, and production. Since the studio's foundation, fabric | ch's architects and scientists have investigated the field of contemporary spaces, from network-related environments which mingle physical and digital properties to the interfacing of dimensions, such as their recent research about "spatial interferences" and "moirés spaces". The work of fabric | ch deals with issues related to the mediation of our relationship to place and distance, to automated climatic, informational, and energy exchanges, mobility, and globalization, all embedded in a perspective of creolization, spatial interbreeding, and sustainability. fabric | ch is composed of Christian Babski, Stéphane Carion, Christophe Guignard, and Patrick Keller.

▲ fabric | ch, Satellite Daylight 66°24'S [2017], interactive installation, neon lights, flat screen, Internet.
Photo: Daniela & Tonatiuh
fabric | ch, Satellite Daylight, 47°33'N [2020], interactive installation, neon lights, flat screen, Internet.
Photo courtesy of the artists.

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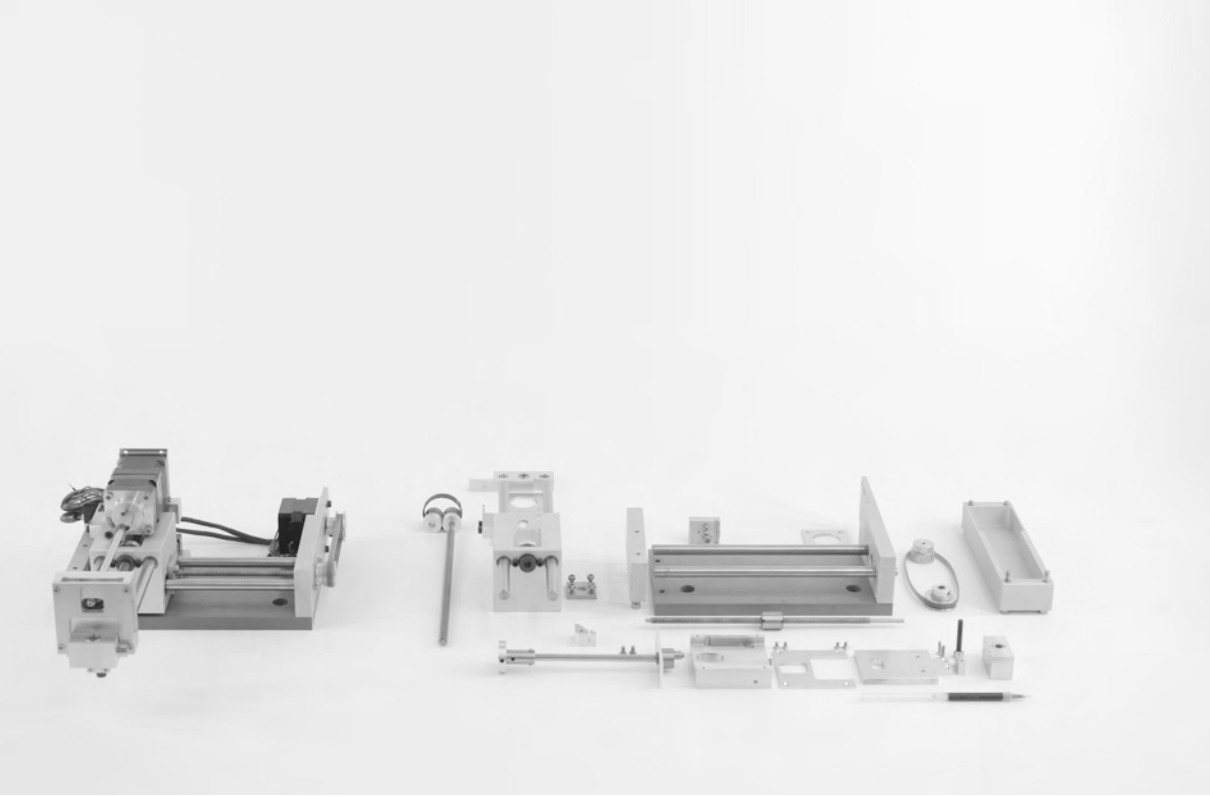

QUADRATURE

Satellites are also the object of analysis of the Quadrature artists. Their recent work, Supraspectives (2020), is a result of the collection of information from 590 spy satellites that remain in orbit, though not all of them are currently in operation. The work calculates the satellites' trajectories and reconstructs what they observe of the world, particularly those satellites that pass near the installation's exhibition site. Information related to the satellites, origin, country, function, are made visible every time that the images related to their trajectories are shown on the screen. Although the images are artistic reconstructions, the work shows a reality that is often invisible or ignored, that of the military use of satellites constantly observing the surface of the earth. Indeed, one might wonder how many spy satellite projects are currently in operation, given that the majority of the population being aware of them. The Satelliten (2015) installation similarly displays the number of satellites that are in orbit. A plotter draws the trajectory of a satellite in a given location on old maps in a space of 10cm2 and in real time. The situation is repeated for each satellite orbiting the same area until the map space is completely covered by a black square.

BIO Quadrature's artistic research focuses on data and physical experiments. The Berlin-based artist duo understand technology as a means to read and write realities. Together they pursue a transdisciplinary approach, using various media, such as time-based performance and installation, as well as classical sculptural and two-dimensional works. For a period of some years, the artists have been working on the methods and stories involved in exploring our world and the cosmos around us. The group's members, Juliane Götz, Sebastian Neitsch and formerly Jan Bernstein (until 2016), have won several awards and scholarships for their artistic practice, including recognition by the Prix Ars Electronica in both 2015 and 2018, scholarships from the Kunstfonds Bonn, Akademie Schloss Solitude, and LaBecque, as well as a fellowship from PODIUM Esslingen and the Hertz-lab of the ZKM Karlsruhe (Centre of Art and Media). Their works are shown around the world in various festivals and exhibitions.

▲ Quadrature [Bernstein, Götz and Neitsch], Satelliten [2015] Mixed media. Photo courtesy of the artists.

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ESTHER POLAK & IVAR VAN BEKKUM

Counter-cartography can have a performative character, instead of being limited to the creation of representations. Artists Esther Polak and Ivar Van Bekkum have created walks and performances in the city, applying the concept of performativity – developed by Judith Butler in her discussion of gender – to urban environment and activities. Their thesis is that a city is only a representation of itself as long as it is not walked through and experienced by people who actuate it through 'move-acts', a transposition of the concept of 'speech-acts'. Esther Polak and Ivar Van Bekkum have also used Google maps and GPS to create their works, be they videos or performances. During a residency in Philadelphia, they developed a software that allowed them to make videos in Google Street View and Google Earth using geolocation and by synchronizing the GPS data with the audio recordings. In their work The Mailman's Bag (2015), the artists collaborated with a mailman and equipped his bag with a sound-recording tool and a GPS. The resulting film creates a view of the postman's path, by making a portrait of a neighborhood in Philadelphia through distorted Google Earth images. The most recent video, The Fortune (2018), uses Google Earth to portray a habitual location for popular protests in The Hague. However, in this film there are no people, just a merry-go-round, which is installed there for a funfair once a year. It typifies a coincidence that occurs when using Google Street View, which depicts the place at a certain time, no matter whether the view actually reflects what usually happens there or not.

BIO Esther Polak and Ivar van Bekkum work together under the name PolakVan Bekkum. Since 2002, their work has focussed on landscape and mobility. Rooted in the history of the Dutch realistic landscape depiction, they engage with new technologies like GPS and data collection to express individual experiences of spaces, like the contemporary city and countryside. They always search to change ways to be in landscapes and how this influences the human understanding and perception of space and the stories we tell to explain our lives. They have worked and exhibited internationally: at Transmediale Berlin, Ars Electronica Linz, ZKM Karlsruhe, IMAL Brussels, Rento Btattinga | Gallery Amsterdam, and Museo for Image and Sound, Sao Paolo. In 2005, Esther Polak received a Golden Nica for interactive Art at Ars Electronica together with Ieva Auzina, for their MILKproject.

▲ Esther Polak & Ivar Van Bekkum, The Mailman's Bag [2015], video, rendering in Google Street View.
Esther Polak & Ivar Van Bekkum, The Fortune [2018], video, rendering in Google Earth.
Photo courtesy of the artists.

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● TOTAL REFUSAL (LEONHARD MÜLLNER & ROBIN KLENGEL)

A performative approach characterizes the work of Total Refusal (Leonhard Müllner & Robin Klengel), particularly in their work Operation Jane Walk (2018). Instead of making guided tours in the real neighborhoods of a city, the artists instead visited virtual spaces in the online video game Tom Clancy's The Division (Ubisoft, 2016), which offers an extremely realistic, albeit dystopian, reconstruction of Manhattan. While the logic of the video game requires players to engage in armed combat within different factions occupying New York City in the future, the artists tried as much as possible to escape any conflict in order to take a walk through the virtual reconstructions of real existing buildings, discussing issues of architecture, history, urbanism, as well as the reasons that led the game's producers to make choices related to the reconstruction of the city. Reflecting on the representation of a city in a virtual universe, which is experienced daily by hundreds of thousands of players on the net, it shows how this kind of cartographic work has an impact on the perception of a city, its history, and identity.

BIO The artist/filmmakers collective and pseudo-Marxist media guerrilla Total Refusal (Leonhard Müllner, Michael Stumpf, and Robin Klengel) intervenes in current video games and writes papers about games and politics. Since 2018, it has been awarded 17 prizes (and 10 honorary mentions) like the Loop Discovery Award, the Contemporary Visual Arts Award of Styria Province, and Vimeo Staff Pick Award, among others. Total Refusal has been screened at more than 120 film and video festivals like Berlinale (2020), BFI London (2018), and IDFA Amsterdam (2018) and they have been exhibited at various exhibition spaces like CURRENTS New Media in Santa Fe (2020) and the Ars Electronica Linz (2019).

▲ Total Refusal [Robin Klengel & Leonhard Müllner], Operation Jane Walk [2018], live online performance, video. Photo courtesy of the artists.

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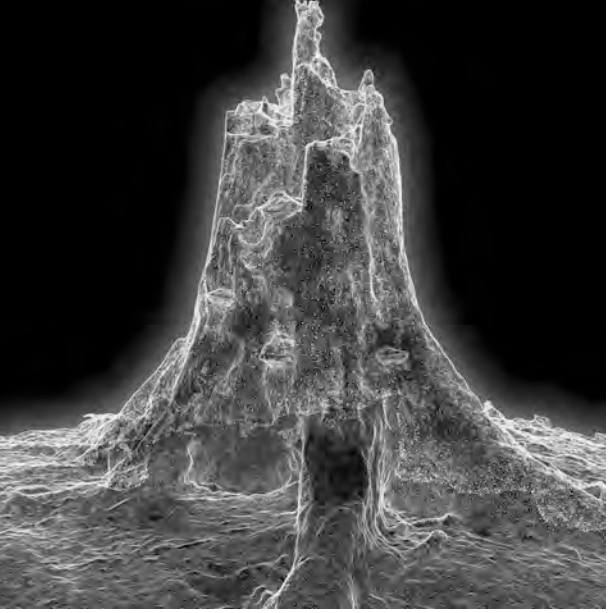

PERSIJN BROERSEN & MARGIT LUKÁCS

Wild landscapes and their representations are often the object of analysis by the artists Persijn Broersen and Margit Lukács. Their work, Forest on Location (2018), consists of scanning through photogrammetry and the digital reproduction of a part of the Białowieza Forest in Poland, a national park, and UNESCO World Heritage Site since 1979. Despite this, the industrial use of wood has recently taken place with the consent of the Polish government, justified by the propagation of bark beetles that undermine the preservation of the trees. The justification has been questioned by ecological organizations, who consider the operation to be solely motivated by economic ends. The scanning of part of the forest by the artists is presented through a video that is accompanied by a song performed by Iranian singer Shahram Yazdani, a cover of the popular song Nature Boy by Nat King Cole, in turn inspired by a song by Yiddish composer Herman Yablokoff. The artists have also made a 3D print of a forest tree trunk, the work Shvayg Mayn Harts (2018), which is used as a projection surface and is a pendant to the video Forest on Location. Applications of their own geographical research tools, such as photogrammetry, are used by the artists to create a poetic work that is also an homage to a real landscape that is also the terrain for political, cultural, and ecological debates.

BIO Persijn Broersen and Margit Lukács are artists who live and work in Amsterdam. They use a wide variety of media – most notably video, animation, and graphics – producing a myriad of works that reflect on the ornamental characteristics of today's society. The work of Broersen and Lukács is characterized by a quest for the sources of contemporary visual culture. They demonstrate how reality, (mass) media, and fiction are strongly intertwined in contemporary society through video pieces that incorporate (filmed) footage, digital animation, and images appropriated from the media. Their films, installations, and graphic work have been shown internationally, at among others Biennale of Sydney (AU), Stedelijk Museum Amsterdam (NL), Rencontres Arles (FR), Art Wuzhen (CN), MUHKA (BE), Centre Pompidou (FR), and Casa Enscendida (ES). The film 'Establishing Eden' was nominated for the IFFR Tiger Awards 2016.

▲ Persijn Broersen & Margit Lukács, Forest on Location [2018], video. Photo courtesy of the artists and AKINCI. Persijn Broersen & Margit Lukács, Shvayg Mayn Harts [2018], 3D sculpture, video, 215x220x165cm. Photo courtesy of the artists and AKINCI.

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● STUDIO ABOVE&BELOW

The studio Above&Below created Digital Atmosphere, an installation using augmented reality to visualize local air pollution data. The work, inspired by early air pollution devices, uses live data inputs to generate an evolving virtual experience. By using virtual reality to visualize air pollution, Above&Below have created a tool that allows for a sensory perception of an otherwise invisible phenomenon. Air pollution is displayed as a flocking system, and although the attempt to map and visualize pollutants in such a way is meant as a poetic experience, the artists invite us to think about ways to understand and discuss pollution in the future. Their work also comes close to research, as they often collaborate with researchers and scientists in the development of their projects. Digital Atmosphere, for example, resulted from conversations with scientists from King's College in London, and the Atmo Sensor was developed in close collaboration with the Swiss INT Studio.

BIO Studio Above&Below is a London- and Ruhrarea-based art and design practice founded by Daria Jelonek and Perry-James Sugden. Their work combines computational design, speculative storytelling, and digital art in order to draw together unseen connections between humans, machines, and the environment – working towards better future interactions with our environment. Believing in research-based art, Studio Above&Below works with scientists, technologists, and communities to push the boundaries of digital media for future living. The duo's work has been exhibited internationally at institutions such as the Royal Academy, Tate Modern, V&A London, Photophore during the Venice Biennale, Today Art Museum, WRO Biennale, SONAR, WIRED Japan, Hyundai Motorstudio, and the International Shortfilm Festival Oberhausen. Previous prizes and funding awarded include the Near Now Fellowship, Collusion Art Funding, Lumen Prize (shortlisted), Bloomberg Bursary, WIRED Creative HackAward (finalist), Communication Arts Award – Interactive Art and the Battersea Sculpture Prize.

▲ Studio Above&Below, Digital Atmosphere [2020], mixed reality sculpture. Photo courtesy of the artists.

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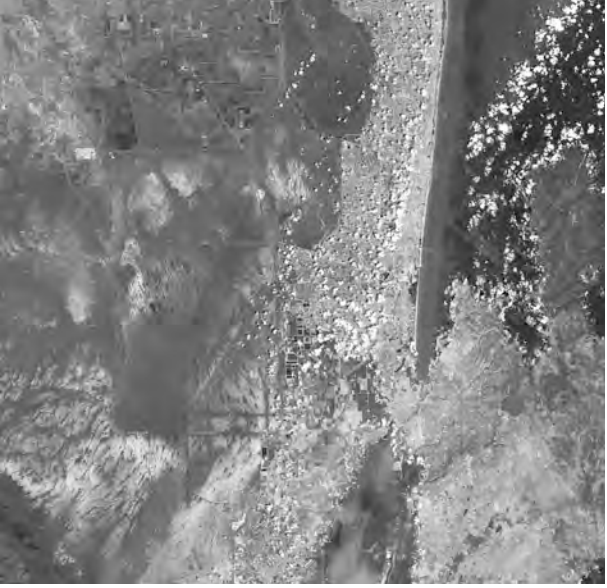

● TEGA BRAIN, JULIAN OLIVER, AND BENGT SJÖLÉN

While ecology is an important and urgent field of research in geographical studies, the use of artificial intelligence not only to analyze climatic and ecological realities, but even to create models for solving environmental problems is a field that is likely to develop further in the future. The artists, Tega Brain, Julian Oliver, and Bengt Sjölén have created a simulation program, based on a supercomputer and machine learning technology, for the creation of plant scenarios in which the possible future climatic conditions are predicted as well as the necessary security measures for the solution of climate crises. The results proposed by the supercomputer in their work, Asunder (2019), are often absurd and improbable. The aim of the artists is, therefore, to question the increasingly widespread use of AI technologies for the solution of ecological problems. Technosolutionism in general, as well as the idea that computational approach is neutral, are both questioned in the artists' work.

BIO Tega Brain is an Australian-born artist and environmental engineer whose work examines how technology shapes ecological relations. She has created wireless networks that respond to natural phenomena, systems for obfuscating fitness data, and an online smell-based dating service. Her work has been shown in the Vienna Biennale for Change, the Guangzhou Triennial, and in venues like the Haus der Kulturen der Welt in Berlin, and the New Museum, NYC, among others.

Julian Oliver is a Critical Engineer, artist, and activist based in Berlin. Exhibiting since 1996, his projects and lectures have been presented at many museums, international electronic-art events, and conferences, including the Tate Modern, Transmediale, Ars Electronica, The Chaos Computer Congress, FILE, and the Japan Media Arts Festival. Work made by Julian, or in collaboration with others, has received several awards. Julian has often dedicated his studies and knowledge in counter-surveillance, network engineering, information security, and systems administration to the assistance of at-risk groups, with a focus on environmental defense.

Bengt Sjölén is an independent software and hardware designer/hacker/artist based in Stockholm and Berlin with roots in the Atari demo scene. He collaborates within several networks like Weise7, Hackteria and Critical Engineering Working Group. His work follows many different threads spanning subjects such as biology, software radio, electromagnetic fields, and artificial intelligence. His work has been presented internationally in events like Arte Mov, Ars Electronica, Synthetic Times Exhibition, NTT ICC Tokyo, Venice Biennale of Architecture, ISEA, Pixelache, World Expo 2010, Transmediale, and The Glass Room.

▲ Tega Brain, Julian Oliver, and Bengt Sjölén, Asunder [2019], three channel video-projection, satellite imagery, CESM climate model, multi-processor computer, and custom software.
Asunder was commissioned by the MAK for the VIENNA BIENNALE 2019.
Photo courtesy of the artists.

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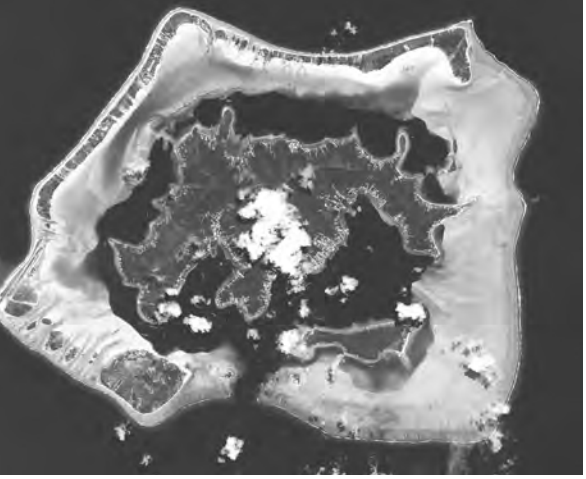

● JAKOB KUDSK STEENSEN

The work Primal Tourism (2016) by Jakob Kudsk Steensen is an exact, full-scale virtual replica of the iconic tourist island of Borabora in French Polynesia. The artist recreated the island in a 3D environment for a virtual reality experience built with the Unreal Engine, using various sources such as cardboard, plans, satellite images, tourist photographs, images from scientific magazines, drawings, and historical reports. The narratives he creates around the island tells stories of tourism, colonialism, and technology. Steensen did not simply use cartographic tools to create a realistic immersion, as often happens in video games that reconstruct existing landscapes, but he also created an immersive environment in which the viewer can discover elements of history, both real and virtual, to create an understanding of the events related to the island that speak of more global ecological problems. The fact that the artist imagines the island of the future, now abandoned and partly covered in water due to global warming, opens new horizons to counter-cartography strategies, including premonitions as a means to raise ethical considerations.

BIO Jakob Kudsk Steensen brings together physical, virtual, real, and imagined landscapes in mixed reality immersive installations. Using a site-specific and slow media approach, he reimagines stories of overlooked ecosystems and of forgotten natural histories. His works are created through collaborations with artists, scientists, and natural history museums, including Michael Riesman, the musical director of Philip Glass's Ensemble, architect David Adjaye, and the Museum of Natural History in New York City and London. Jakob was a finalist for the Future Generation Art Prize at the 2019 Venice Biennale. He received the Serpentine Augmented Architecture commission in 2019 to create his work 'The Deep Listener' with Google Arts and Culture. He is the recipient of the best VR graphics for RE-ANIMATED (2019) at the Cinequest Festival for Technology and Cinema, the Prix du Jury (2019) at Les Rencontres Arles, the Webby Award - People's Choice VR (2018), and the Games for Change Award - Most Innovative (2018), among others.

▲ Jakob Kudsk Steensen, Primal Tourism [2016-2020], virtual simulation of Borabora, video game engine. Photos in the Video file: Photo courtesy of the artist.

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FEI JUN

Fei Jun has created an interactive video game consisting of two interaction modes. The first allows the public to create a virtual world using more than 300 objects that the artist has reconstructed from ordinary objects. The second interaction mode enables the audience to roam in the real-time rendered world via an iPad application on the exhibition's site. Users can interact with virtual worlds and create diplomatic relations between them, helping to build different worlds, sharing resources, or sabotaging others. Although the artist makes use of scanning techniques of real objects, the strength of his work does not lie in his representative power, but in his allegorical one. His work is a social experiment involving diplomatic dynamics for the collaborative construction of the representation of a virtual world.

BIO Fei Jun is the head of CAFA Media Lab, an associate professor in interactive media art and design, China Central Academy of Fine Arts as well as a working artist and designer. He is also a co-founder of Moujiti interactive. His art and design work has been exhibited nationally and internationally in galleries, museums, and at festivals and has received many international awards, including the IF design award. His artistic practice has crossed digital art, interactive art, experience design, interface design, interaction design, digital publishing, and other unknown areas. As an artist, he is particularly interested in the hybrid space that is constructed by virtual and physical space; as a designer, Fei Jun has been creating mobile applications and interactive installations for clients, including the Palace Museum, Audi, Trends Media Group and etc.; as an educator, he has been teaching an interactive art and design program in CAFA since 2005.

▲ Fei Jun, Interesting World installation 1 [2019], interactive installation, game engine, application. Photo courtesy of the artist.

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