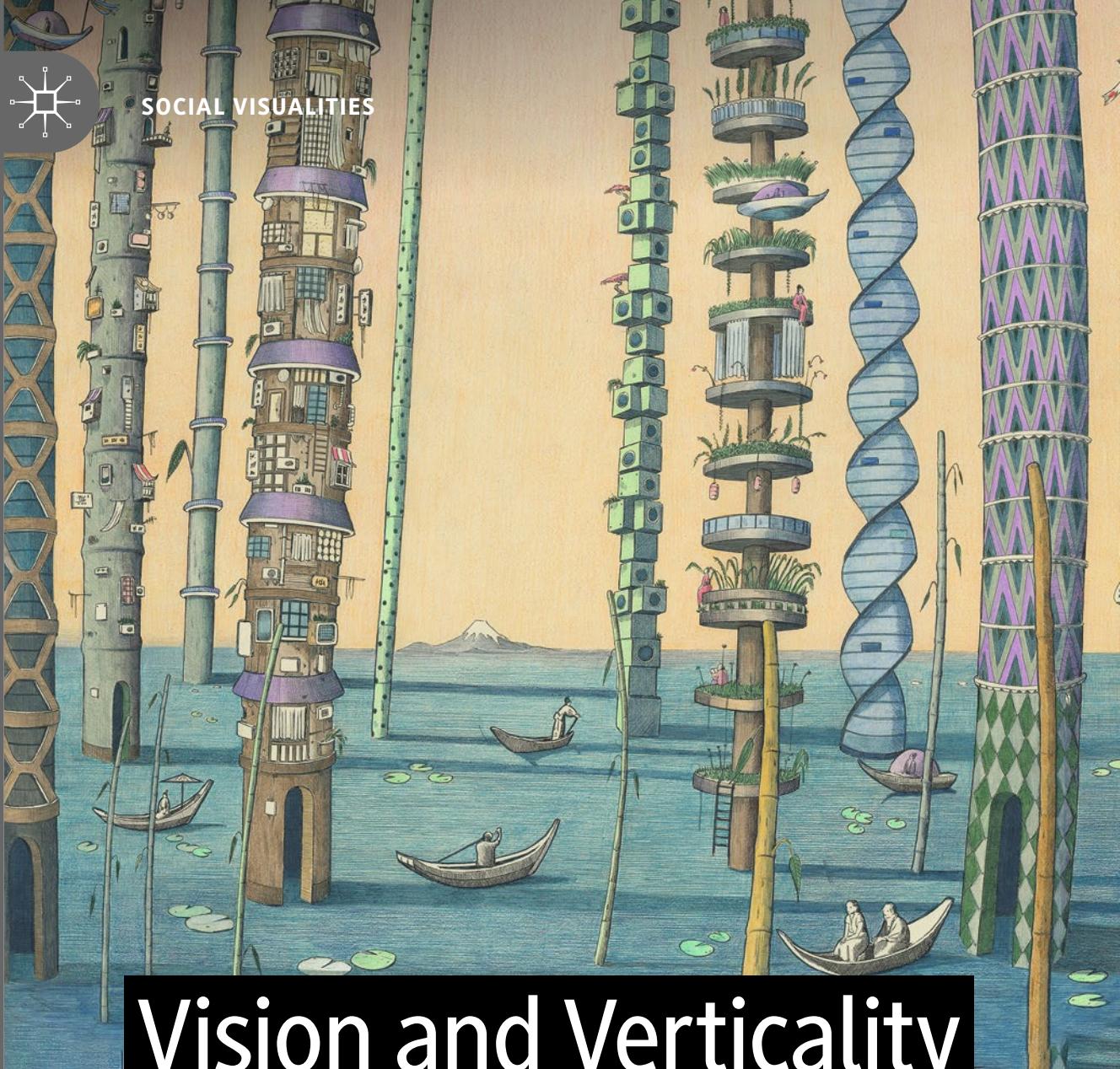




SOCIAL VISUALITIES



Vision and Verticality

A Multidisciplinary Approach

Edited by Gary Bratchford · Dennis Zuev



Social Visualities

palgrave
macmillan

Social Visualities

Series Editors

Gary Bratchford
School of Journalism
University of Central Lancashire
Manchester, UK
Dennis Zuev
c/o Nickolay Nickolaevich Zuev
City University of Macau
Krasnoyarsk, Russia

This book series, affiliated with the ISA's RC57 research group <https://bit.ly/3mgQQ5S>, examines the role and function of images, objects and/or performances within society and/or in particular cultures or communities. The series foregrounds visuality as a useful theme to approach the production, representation and naturalisation of power (state or otherwise) and society that otherwise remains hidden or unseeable.

With an emphasis on socio-visual thinking, the series unpicks some of the pre-existing imaginaries and boundaries that still dominate a major discipline like sociology. In particular, the ways in which we engage with images, their production and use in specific spaces and contexts. To this end, Social Visualities looks to further normalise the visual as a valid data source as well as provide a platform for the interrogation and analysis of new, emerging and ever-changing types of visual data and image production practices.

The series provides theoretically rich, case-study oriented guides that address the ongoing scholarly and pedagogic 'visual turn' in the social sciences, including, but not limited to visual global politics and international relations, visual criminology as well as topics more broadly associated to visual culture and society.

Gary Bratchford • Dennis Zuev
Editors

Vision and Verticality

A Multidisciplinary Approach

palgrave
macmillan

Editors

Gary Bratchford
Birmingham City University
Birmingham, UK

Dennis Zuev
CIES-ISCTE
Lisbon, Portugal

University of Saint Joseph
Macau, China

ISSN 2731-4626

Social Visualities

ISBN 978-3-031-39883-4

ISSN 2731-4634 (electronic)

ISBN 978-3-031-39884-1 (eBook)

<https://doi.org/10.1007/978-3-031-39884-1>

© The Editor(s) (if applicable) and The Author(s), under exclusive licence to Springer Nature Switzerland AG 2023

This work is subject to copyright. All rights are solely and exclusively licensed by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed. The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors, and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Cover illustration: My Plan for Japan by Ana Aragão

This Palgrave Macmillan imprint is published by the registered company Springer Nature Switzerland AG.

The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Paper in this product is recyclable.

Acknowledgements

The goal of this book was to synthesize the analysis and understanding of verticality via diverse visual approaches—artistic and academic. In these attempts, we are thankful for all those who helped, supported and contributed to this volume. It is the contributions and contributors which make edited volumes and for everyone who submitted a chapter, we are indebted.

Efforts were made to represent and engage with as many scholars, artists, ideas, regions and communities as possible. We also extend our gratitude to those who expressed support for the project and made every effort to contribute but for multiple reasons could not participate.

We thank our families, who have been encouraging us through yet another project! Finally, a big thanks to Helen Monagle for her continued feedback and time.

Contents

1	Introduction: Vision & Verticality—A More Visual Sociology of the Sky	1
	Gary Bratchford and Dennis Zuev	
Part I	Experimental and Experiential Approaches to Volume and Atmospheres	17
2	Open-Weather Feminist Handbook: A Preamble	19
	Sasha Engelmann and Sophie Dyer	
3	Of Carnal Gravity: A Three-Voice Conversation.....	25
	Julie Patarin-Jossec, Jean-François Clervoy, and Jeanne Morel	
4	Seeing in Verticality: From ‘Vertical Gaze’ to ‘Figuring Out’	39
	Andrea Mubi Brighenti and Andrea Pavoni	
5	Vertical Visualities, Experiences and Inequalities: A Conversation with Stephen Graham	55
	Gary Bratchford, Stephen Graham, and Dennis Zuev	
Part II	Sensing, Seeing, and Monitoring from Above	67
6	Repositioning Drone Sensing in Landscape Urbanism and Planning	69
	Ole B. Jensen and Paul Cureton	
7	Vocabularies of Drone Sensing.....	85
	Anna Jackman	
8	Viewing from Where? Satellite Imaging and the Politics of Space Technology: Unpacking Depravity’s Rainbow	99
	Lewis Bush	
9	The Algorithmic Apparatus of Neocolonialism: Counter-Operational Practices and the Future of Aerial Surveillance . . .	109
	Anthony Downey	

Part III Assembling and Representing: Artistic Perspectives on Volume, Vertigo, and Falling	123
10 Wassily Kandinsky and the Aerial Gaze: Questioning the Punctual, Linear and Planar Forces Inherent in the Politics of Visibility Conveyed by Police Drones	125
Francisco Klauser	
11 After <i>Falling Away</i>: Reflections on a Vertiginous Art Exhibition	137
Davide Deriu	
12 Towards a Typology of Imaginary Skyscrapers	145
Ana Aragão	
13 Higher Returns	155
David Kendall	
Part IV Mapping Cultural Landscapes, Vertically	163
14 Epistemology of the ‘<i>Laje</i>’: Notes from Favela Rooftops	165
Bianca Freire-Medeiros and Leo Name	
15 Rio’s “<i>Natural Born Monument</i>”: Visual Imaginaries of The Sugarloaf Mountain	179
Jorge de La Barre	
16 Elemental Monsters: Aeolian Politics and the Protests Against Renewable Energy in Tinos, Greece	195
Adam Fish	
17 Revitalization and Touristification: The Vertical Cultural Landscape of Dacha Community in Siberia	205
Artem Yakovlev and Dennis Zuev	
Index	213

Notes on Contributors

Ana Aragão born in Porto, 1984. Graduated as an architect from the Faculty of Architecture of the Porto University (FAUP, 2009), where she joined the teaching team in 2009. Scholarship holder from Portuguese Foundation for Science and Technology (FCT). Currently, Ana works exclusively on drawing, exploring the theme of urban imaginaries and paper architecture. She runs her own atelier in Porto since 2012. She was an invited artist in the Italian Pavilion of the Venice Architecture Biennale 2021 and Portuguese representative in its 2014 edition. Elected by Luerzer's Archive as one of the “200 Best Illustrators Worldwide” in 2014. She had two solo exhibitions which are linked to her fascination with the oriental urbanscapes: “Imaginary Beings” and “No Plan for Japan”. She currently curates “Vanishing Points”, a collective exhibition in Zaha Hadid’s London Roca Gallery. Her drawings can be found in private art collections across the world and in the collections of Sociedade Nacional de Belas Artes, Rectory of Oporto’s University, Orient Museum Lisbon and Orient Foundation Macau.

Jorge de La Barre holds a PhD in Sociology from École des Hautes Études en Sciences Sociales (EHESS, Paris, France, 2004). He is an associate professor with the Sociology Department (GSO-UFF), the Graduate Programme in Sociology at Universidade Federal Fluminense (PPGS-UFF), and the Graduate Programme in Music at Universidade Federal de Pernambuco (PPGM-UFPE) (Brazil). Barre is a researcher at the Laboratório de Etnografia Metropolitana (LeMetro/IFCS-UFRJ); researcher at the Núcleo de Estudos Cidadania, Trabalho e Arte (NECTAR/ICHF-UFF); member of the Grupo de Reconhecimento de Universos Artísticos/Audiovisuais (GRUA/IFCS-UFRJ); member of the Groupe post-conflicts (Laboratoire d’Anthropologie des Enjeux Contemporains—LADEC, Université Lyon II) and member of the Urban Culture Studies Collective (University of California, Davis). Acting on the following themes: visual culture, auditory culture, music and city, urban culture, culture and globalization.

Gary Bratchford is an Associate Professor of Photography at Birmingham City University, UK. He is co-editor of *Visual Studies Journal and Visual Culture in Britain*. He was President of the International Sociological Association’s Research Committee for Visual Sociology (RC57) from 2018–2023.

Andrea Mubi Brightenti is Professor of Social Theory and Space and Culture at the Department of Sociology, University of Trento, Italy. His research covers topics of space, power and society, with a focus on the territoriality of public space. His latest monograph is *Elias Canetti and Social Theory. The Bond of Creation* (Bloomsbury, 2023).

Lewis Bush is an artist, academic and researcher, currently based at LCC, London, UK. His work focuses on ways to visualize powerful agents, technologies and practices, and the links that connect them through a multidisciplinary range of research strategies. Bush has been nominated and shortlisted for prizes including the C/O Berlin Talent Award 2021, the FOAM Paul Huff Award 2021 and 2020, the Kassel Book Dummy Award 2019, Tim Hetherington Visionary Award 2018 and 2017, the Luma Rencontres d'Arles Dummy Book Award 2018, 2016 and 2015, and the Photo Espana Book Award 2016. His work is held in institutional and private collections including at The Museum of London (UK), The Victoria & Albert Museum Library (UK) and The Tate Library (UK). His most recent work, entitled *Depravity's Rainbow* (2023), explores the connections between early space travel and colonialism and the Holocaust, and the impact of that history on the present.

Jean-François Clervoy successively active CNES, ESA and NASA astronaut for 33 years. Born in 1958, JFC graduated from Ecole Polytechnique, from SupAero college of Aerospace engineering and from Test flying school. He flew on three space shuttle missions: in 1994 to study the atmosphere, in 1997 to resupply the Russian space station Mir and in 1999 to repair the Hubble space telescope. JFC is Founder and Ambassador of *Air Zero G* which organizes weightlessness flights. He qualified as private pilot, skydiver and scuba diver. He is member of several organizations promoting space exploration and preservation of planet Earth.

Paul Cureton FRSA is Director of Post-Graduate Research, LICA, Director of PhDs, Design and Senior Lecturer in Design at ImaginationLancaster and a member of the Data Science Institute (DSI). His work transcends subjects in spatial planning, 3D GIS modelling and design futures. It is at the forefront of exploring the critical interface of new and emerging socio-technological relationships such as Design for Digital Twins, Drone Futures and novel process-based methodologies for Future Environments such as Geodesign and XR interactions. His recent publications include the monographs, *Strategies for Landscape Representation: Digital and Analogue Techniques* (Routledge, 2016) and *Drone Futures: UAS for Landscape & Urban Design* (Routledge, 2020). In addition, he is a co-author with Nick Dunn of *Future Cities: A Visual Guide* (Bloomsbury, 2020).

Davide Deriu is Reader in Architectural History and Theory at the University of Westminster. His research explores critical intersections between spatial and visual cultures, and has been funded by the AHRC, the British Academy, Yale University's Paul Mellon Centre and the Canadian Centre for Architecture. Davide's writing appears in a number of books as well as journals such as *Architectural Theory Review*, *The Journal of Architecture* and *Emotion, Space and Society*. As part of the Vertigo in the

City project, in 2021 he curated the exhibition *Falling Away* at Ambika P3. His new book, *On Balance* (2023), is published by Lund Humphries.

Anthony Downey is an academic, editor and writer. He is Professor of Visual Culture in the Middle East and North Africa, Birmingham City University. He sits on the editorial boards of *Third Text*, *Digital War*, and *Memory, Mind & Media*, respectively, and is the series editor for *Research/Practice* (2019–ongoing). Recent and upcoming publications include *Algorithmic Anxieties and Post-digital Futures* (forthcoming, MIT, 2024); Trevor Paglen: *Adversarially Evolved Hallucinations* (forthcoming, Sternberg Press/MIT, 2024); Nida Sinnokrot: *Palestine Is Not a Garden* (Sternberg Press and the ACT Programme at MIT, 2023); Khalil Rabah: *Falling Forward—Works 1995–2025* (Sharjah Art Foundation and Hatje Cantz, 2023); *Topologies of Air*: Shona Illingworth (Sternberg Press and the Power Plant, 2022), Heba Y. Amin: *The General's Stork* (Sternberg Press/MIT, 2020), and *Critique in Practice* (Sternberg Press/MIT, 2019). In his capacity as a co-investigator, Downey is the Cultural and Commissioning Lead on a multi-disciplinary AHRC Network Plus award, where his research focuses on cultural practices, digital methods and educational provision for children with disabilities in Lebanon, the Occupied Palestinian Territories and Jordan (2020–2024).

Adam Fish is a Scientia Associate Professor in the Faculty of Arts and Social Sciences, School of Arts and the Media, at the University of New South Wales. He is a cultural anthropologist, documentary video producer and interdisciplinary scholar who works across social science, computer engineering, environmental science and the visual arts. Fish employs ethnographic, participatory and creative methods to examine the social, political and ecological impacts of new technologies. He has authored three books including *Hacker States* (MIT 2020, with Luca Follis), about how state hacking impacts democracy; *Technoliberalism* (Palgrave Macmillan 2017), an ethnography of the politics of internet and television convergence in Hollywood and Silicon Valley; and *After the Internet* (Polity 2017, with Ramesh Srinivasan), which reimagines the internet from the perspective of grassroots activists, citizens and hackers on the margins of political and economic power.

Bianca Freire-Medeiros is Associate Professor of Sociology at University of São Paulo (USP) and Associate Researcher at the Center for Metropolitan Studies (CEM/USP), where she coordinates the UrbanData—Brazil/CEM: bibliographic databank on urban Brazil. She is Co-PI for the “Global Cars: A Transnational Urban Research on Vehicle Informal Economies (Europe, Africa and South America)”, a five-year-long research project financed by FAPESP (Brazil) and ANR (France). She was J.W. Fulbright—Dr Ruth Cardoso Chair at Georgetown University (Fall 2021).

Stephen Graham is a scholar of cities and urban life. He is Professor of Cities and Society at Newcastle University’s School of Architecture, Planning and Landscape. Graham’s research and writings explore how cities and urban life are being transformed through transformations of infrastructure, mobil-

ity, digital media, militarisation and surveillance. His more recent work addresses the politics of urban security and the growing vertical reach of cities. Graham's books include *Splintering Urbanism; Telecommunications and the City* (both with Simon Marvin), *Cybercities Reader; Cities, War and Terrorism* and *Disrupted Cities: When Infrastructure Fails*. Graham's 2011 book *Cities Under Siege: The New Military Urbanism* was nominated for the Orwell Prize in political writing and was a *Guardian's* book of the year. His most recent book, *Vertical: The City from Satellites to Bunkers*, was published by Verso in 2016. Graham is a fellow of the British Academy.

Anna Jackman is Lecturer in Human Geography at the University of Reading. Anna is a feminist political geographer interested in technological visibilities, volumes, relations and futures. Her current research approaches these issues through the lens of the drone, exploring the “unmanning” of everyday, urban and military life in the drone age. Anna's ESRC-funded “Diversifying Drone Stories” research project engaged with a range of stakeholders (including emergency services, lawyers, industry, local authorities, pilots and air traffic controllers, and members of the public) to explore the diverse use, perception and impact of drones in changing UK airspace.

Ole B. Jensen is Professor of Urban Theory at the Department of Architecture, Design and Media Technology, Aalborg University, Denmark. He is deputy director and co-founder of the Centre for Mobilities and Urban Studies (C-MUS). He is the author of *Staging Mobilities*, Routledge, 2013, and *Designing Mobilities*, 2014, Aalborg University Press, the editor of the four-volume collection *Mobilities*, Routledge, 2015 and author (with Ditte Bendix Lanng) of *Mobilities Design. Urban Designs for Mobile Situations*, 2017, Routledge, co-editor of the Routledge Handbook of Urban Mobilities, 2020 (with Claus Lassen, Ida S.G. Larsen, Malene Freudendal-Pedersen and Vincent Kaufman).

David Kendall is a British artist and visiting fellow within the Centre for Urban and Community Research, Department of Sociology, Goldsmiths, University of London. His photography and research explore how spatial, economic and design initiatives, as well as participatory practices, combine to encourage social and spatial interconnections or dissonance in cities. Kendall has presented and exhibited research at cultural and academic institutions including The Photographers' Gallery, London, Queens University Belfast, Goldsmiths, University of London, Tate London, Queen Mary, University of London, Centro Cultural Manuel Gómez Morín, Santiago de Querétaro, Mexicó, Whitechapel Gallery, London, UK, Jüdisches Museum Berlin, Germany, UCL, London, UK, Akademien Valand, Göteborg, Sweden, The British Library, London, UK, Culturgest, Lisbon, Portugal, Rotterdam Photo, The Netherlands, University of Cambridge, UK, and University of Oxford, UK.

Francisco Klauser is Professor of Political Geography at the University of Neuchâtel, Switzerland. His work explores the socio-spatial implications, power and surveillance issues arising from the digitisation of present-day life, thus bridging the fields of human geography, surveillance studies and risk

research. Main research topics include video surveillance, mega-event security, smart cities, airport surveillance, civil drones and big data in agriculture.

Jeanne Morel is an artist and researcher, graduated from the Lyon Conservatory and the University of Art History and Philosophy. Morel works in extreme terrains and particularly in weightlessness with architect and new media artist Paul Marlier. Both lead research and creation programmes with the French space agency (CNES), European space agency (ESA) and astronaut Jean-François Clervoy. Together, they develop generative and immersive projects between art, science and philosophy in order to share the space quest to each human being. Also, an actress and director, Jeanne is a member of UNESCO, gives various conferences and works with young students and people in precarious situations.

Leo Name is Professor of Architecture and Urbanism at the Faculty of Architecture of the Federal University of Bahia. With attention to decolonial epistemology and asymmetries of race, gender, class and place, his research focuses on reproduction and circulation of images of Latin American and Caribbean landscapes, territories and bodies; geopolitics of knowledge about space and spatialities, especially in geography, architecture, urbanism and landscape architecture; and critical methodologies and pedagogies for education in architecture and urban design.

Open-weather is a feminist experiment in imaging and imagining the earth and its weather systems using DIY community tools. Co-led by researcher-designer Sophie Dyer and creative geographer Sasha Engelmann, open-weather encompasses a series of how-to guides, critical frameworks and public workshops on the reception of satellite images using free or inexpensive amateur radio technologies. In the tradition of intersectional feminism, open-weather investigates the politics of location and interlocking oppressions that shape our capacities to observe, negotiate and respond to the climate crisis. In doing so, open-weather challenges dominant representations of earth and environment while complicating ideas of the weather beyond the meteorological.

Julie Patarin-Jossec holds a PhD in Sociology, professional certifications in SCUBA, technical, and surface air supplied diving, and is a light aircraft pilot. While most of her research resulting from her PhD focused on astronaut training and outer space exploration politics, she spent the few past years developing underwater and extreme environment photography and filmmaking practice. She has taught at French and Russian universities, is the founder of several visual methodologies working groups (e.g. International Political Science Association's "Visual Politics" committee), is co-editor of *Visual Studies* and a fellow of the Royal Society of Arts. Among others, Julie is the author of *Manufacturing the Astronaut: An Earthly Ethnography of the International Space Station* (Petra, 2021) and *Storytelling of Water: About Ethnography, Photography, and Feminist Ecologies* (Immaterial Books, forthcoming in 2023).

Andrea Pavoni is an assistant research professor at DINAMIA'CET, ISCTE-IUL (Lisbon, Portugal). His research explores the relation between materiality, normativity and aesthetics in the urban context. He is a fellow at the Westminster Law and Theory Lab, co-editor of the *Law and the Senses Series* (University of Westminster Press) and associate editor at the journal *Lo Squaderno, Explorations in Space and Society*. He is the author of *Controlling Urban Events. Law, Ethics and the Material* (Routledge 2018).

Artem Yakovlev graduated from Krasnoyarsk State University, Russia, in 2001. He is a columnist of the Gudok publishing house of Russian Railways, head of the non-profit organization “Yarkkiye dela”. He published seven books of fiction and documentary prose, as well as multiple publications in the fiction and journalist collections, as well as literary magazines. He was a finalist of an international literature award “Русский Stil”, winner of several professional competitions of the Union of Russian Journalists. He has also published over 200 popular science articles on history of various settlements in the Krasnoyarsk territory, as well as travel essays in Russian regions and abroad.

Dennis Zuev is a professor at University of Saint Joseph, Macau, China, and senior researcher at CIES-ISCTE, Lisbon, Portugal. He is also an affiliated researcher with the Instituto Oriente at University of Lisbon and a member of Urban Transitions Hub, ICS, UL, Lisbon, Portugal. He is a co-founder (in 2006) and vice-president (research) of ISA Research Committee in Visual Sociology (2010–2018). In 2018 he published *Urban Mobility in Modern China: The Growth of the E-bike* with Palgrave and co-authored the book *Visual Sociology: Politics and Practices in Contested Space* with Gary Bratchford (2020).

List of Figures

Fig. 1.1	Rima Maroun in an empty pool, Lebanon 2020 from the series, While Standing my Ground: Self Portraits from Above (2020).....	5
Fig. 1.2	Ladders secured to the scaffold. New York. 2020. Bamboo scaffolding used together with plastic as a temporary shield during reconstruction of a historical landmark in Macau. 2022.	8
Fig. 1.3	Courtyard seen from the tourist cable car gondola in Almaty, Kazakhstan, 2011. The moving shade of the overhanging gondola itself is a continuous reminder to the residents of extraneous objects and strangers above their heads	9
Fig. 2.1	DIY satellite ground station workshop by open-weather on the occasion of the Weather Engines exhibition curated by Daphne Dragona and Jussi Parikka at Onassis Stegi, Athens, May 2022. (Photography by Dimitris Michalakis) ...	20
Fig. 2.2	NOAA-19, Isle of Mull, 20 July 2021, 12:18 GMT. (Open-weather CC BY 4.0)	23
Fig. 3.1	Portrait of Jean-François Clervoy wearing fighter jet helmet, by Julie Patarin-Jossec, photographed at CNES headquarters in Paris. 2020. Credits: Julie Patarin-Jossec	27
Fig. 3.2	Jean-François Clervoy, Scott Parazynski, and mascot “Hog” from the STS-66 crew, “living upside down” aboard the Atlantis Space Shuttle. 1994. Credits: NASA	28
Fig. 3.3	Jeanne during her first 0G flight with Novespace, following her selection by the French Space Agency CNES to conduct a creation project in weightlessness. The motion capture of her dance generated hers and Paul’s first artwork in real time. 2016. (Credits: Paul Marlier)	29
Fig. 3.4	The STS-84 crew looking up to the Earth from the Atlantis Space Shuttle. 1997. Credits: NASA	30
Fig. 3.5	Julie Patarin-Jossec wearing surface-supplied air equipment for underwater welding training, Fréjus. 2022. Credits: Théo Bothorel.....	32
Fig. 4.1	America Is Bleeding. Networked cameras from all over New York created into online net artwork, 2005 (artwork by Stanza).....	43

- Fig. 4.2 *The Nemesis Machine in Madrid Spain. Cables Boards, Screens, IoT Networks, sensors, Custom Electronic Custom Software, 2010–2020 (artwork by Stanza)* 44
- Fig. 4.3 The Nemesis Machine in Madrid Spain. Cables Boards, Screens, IoT Networks, sensors, Custom Electronics Custom Software, 2010–2020 (artwork by Stanza) 45
- Fig. 4.4 Complexities. Surface Scars and Cuts. Exhibited at The Intelligent City exhibition, Bruges Museum 2015 (artwork by Stanza) 46
- Fig. 4.5 Urban Generation. Installation Version. Wires, Cables, Screens, Net Art. Real-time software, 2002–2004 (artwork by Stanza) 49
- Fig. 6.1 British Camp Iron Age hillfort, Colwall, Herefordshire, 16 August 1958. Also known as Herefordshire Beacon Camp. © Historic England Archive. Harold Wingham Collection HAW/9389/26 70
- Fig. 6.2 Wingtra AG, City of Zurich Mesh Model using a Wingtra Survey Drone. 800 ha (1980 ac) of the city centre at a GSD of 3.1 cm (1.2 in) in 6 flight hours, 2021 72
- Fig. 6.3 Junjie Luo, Tianhong Zhao, Lei Cao, Filip Biljecki, 2022. UAV panoramic oblique images and their semantic segmentation results 74
- Fig. 6.4 Chunfeng Lu, 2021, A Glimpse of a Pleasure Garden, MLA22, Charles Waldheim Studio, “Shading Sunset: Reimagining the Streets of Los Angeles for a Warmer Future”, Harvard University, Graduate School of Design 77
- Fig. 6.5 Karen M’Closkey & Keith VanDerSys, 2022. Image comparing existing NLCD (left) and our site-surveyed high-resolution land cover data (right). The custom land cover was created using UAV multispectral imaging to train and recognise wetland plants and mudflats that were not otherwise depicted in the standardised NLCD 78
- Fig. 7.1 Drone. (Credit: MIKI Yoshihito (2015). Source: <https://www.flickr.com/photos/mujitra/19631093571/> (Attribution 2.0 Generic CC BY 2.0)) 87
- Fig. 8.1 Brockenhaus, former Stasi eavesdropping installation. Brocken Mountains, Germany. Composite satellite image, from the series Shadows of the State (2014–2018) 101
- Fig. 8.2 KH-1 Corona satellite photograph of the Pentagon, Washington DC. Public domain satellite image 1967, from the series Shadows of the State (2014–2018) 103

Fig. 8.3	The first photograph of the Earth taken from beyond the Karman Line, the internationally recognised boundary between earth and space. It was captured by a V-2 rocket with a camera mounted in its nose during post-war evaluation of the rockets in the United States (1947). Cyanotype print from archive photograph, printed 2022. From the series Depravity's Rainbow (2018–2022)	104
Fig. 8.4	Mittelwerk factory complex, Nordhausen, Germany. A network of underground tunnels under the Brocken mountains, repurposed for weapons production, concentration camp inmates from the attached Mittelbau-Dora camp constructed thousands of V2 rockets here, including MW 18014, the first man-made object to cross the Karman line and reach space on 20 June 1944. Cyanotype print from own photograph taken 2019, printed 2022	105
Fig. 9.1	Shona Illingworth, <i>Topologies of Air</i> , 2021. Three-channel digital video and multichannel sound installation, 45 min. Courtesy of the artist. Installation view: Topologies of Air, The Power Plant, 2022. Photo: Toni Hafkenschied	110
Fig. 9.2	Shona Illingworth, <i>Topologies of Air</i> , 2021. Video stills. Courtesy of the artist. Centre image, courtesy of Moesgaard Museum	112
Fig. 9.3	Shona Illingworth, <i>Topologies of Air</i> , 2021. Video stills. Courtesy of the artist. Archive images courtesy of the Imperial War Museum, London, and NASA	114
Fig. 9.4	Shona Illingworth, <i>Topologies of Air</i> , 2021. Video stills. Courtesy of the artist. Centre image, courtesy of Moesgaard Museum	120
Fig. 10.1	Painting by V. Kandinsky: Delicate Tension	128
Fig. 10.2	Painting by V. Kandinsky: Transverse Line (1923)	128
Fig. 11.1	Cover, <i>Falling Away</i> exhibition catalogue (edited by Davide Deriu & Michael Mazière, 2021)	139
Fig. 11.2 and 11.3	Stills from <i>Descent</i> (Catherine Yass, 2002, 16 mm film transferred to digital media)	140
Fig. 11.4	<i>High Wire</i> (Catherine Yass, 2008, 16 mm film and HD cam transferred to digital media). Four-screen installation at Falling Away exhibition, Ambika P3, London, 2021. (Photo by David Freeman)	141
Fig. 11.5	<i>Last Stand</i> (Catherine Yass, 2018, 16 mm film transferred to digital media)	142
Fig. 11.6	<i>Last Stand</i> (left) and <i>Descent</i> (right). Film installations on display at the Falling Away exhibition, Ambika P3, London, 2021. (Photo by David Freeman)	142
Figs. 11.7 and 11.8	Stills from <i>Concrete Mixer</i> (Catherine Yass, 2021, HD video, 2 screens at right angles)	143

- Fig. 12.1 Ana Aragão, *Flying Machine*, 2018, 100 × 164 cm..... 147
- Fig. 12.2 Ana Aragão, *Framed Cathedral*, 2018, 100 × 164 cm..... 148
- Fig. 12.3 Ana Aragão, *Walking Pyramid*, 2018, 100 × 162 cm..... 149
- Fig. 12.4 Ana Aragão, *Social Obsolence*, 2018, 100 × 186 cm..... 151
- Fig. 12.5 Ana Aragão, *Last Fiction*, 2018, 100 × 179 cm..... 152
- Fig. 12.6 Ana Aragão, *Cloud Cover*, 2018, 100 × 158 cm 153
- Fig. 12.7 Ana Aragão, *Failed Modern*, 2018, 100 × 232 cm..... 154
- Fig. 13.1 Unique land, unique landscapes, David Kendall, 2023 156
- Fig. 13.2 Where life is extraordinary, David Kendall, 2023 157
- Fig. 13.3 This is elevated living, David Kendall, 2023 158
- Fig. 13.4 Good life, made affordable, David Kendall, 2023 159
- Fig. 13.5 The lifestyle you dream of, David Kendall, 2023 160
- Fig. 14.1 The *laje* and its multiple uses versus the heliport at the 34-story cylindrical building that was designed by Oscar Niemeyer and features landscaping by Burle Marx, both internationally acclaimed names. Its first opening was in 1972, when Favela da Rocinha was still a medium-sized community, and the hotel enjoyed years of glory during the 1970s and 1980s. When the photo was taken and for two decades (from 1995 to 2016), the hotel was out of business. (Source: Freire-Medeiros, 2012) 166
- Fig. 14.2 On the *laje* to the left, a shower and a clothesline. On the other one to the right, a laundry sink, some potted plants and an access door. Around and above them, white flexible pipes and the typical blue suspended tanks, both installed by residents, provide the informal infrastructure for the supply and distribution of water. In the background, the steep slopes of the hills vertically and horizontally occupied by buildings that have been mostly self-constructed. (Source: Freire-Medeiros, 2012) .. 167
- Fig. 14.3 Another angle of the *laje* with the clotheslines, showing its location below and alongside other constructions. (Source: Freire-Medeiros, 2012) 168
- Fig. 14.4 The stairs are external to the house and depart from the street level. The lower floor ceiling gives access to the house door, preceded by a clothesline. To the left, tourists walk along the “street” established by the slab of another building. To the right and at the back, other stairs give access to another *laje*. (Source: Freire-Medeiros, 2011) 170
- Fig. 14.5 Foreground: due to the proximity between the *lajes* it is possible to use them as a suspended circulation path (on the right, a frame of joists indicates that a new *laje/stretch* is under construction). Background: towers of high-end buildings, one of them with a helipad, make up the landscape. (Source: Freire-Medeiros, 2009) 171

Fig. 14.6	Two boys play among slabs, water tanks, rebar and metal and fibre cement tiles. In the background, a clothesline and pay TV antennas. (Source: Freire-Medeiros, 2009)	172
Fig. 14.7	A boy rescues his kite on the <i>laje</i> of an eight-story building. In the background, the sea and the green mountains of the South Zone of Rio de Janeiro. (Source: Freire-Medeiros, 2009)	172
Fig. 14.8	Camera in hand, a white woman tourist uses the <i>laje</i> as a viewpoint to photograph the multi-story buildings with apparent pipes, tanks, beams, and bricks. On the short wall that serves her as a guardrail, there is a makeshift pipe fixed with mortar. (Source: Freire-Medeiros, 2009)	173
Fig. 14.9	The stirrups indicates an ongoing construction, and that like other <i>lajes</i> in favelas, this one is also a potentially mutable and in continuous expansion space. (Source: Freire-Medeiros, 2011).	175
Fig. 15.1	“Eu só vendo a vista,” by visual artist Marcos Chaves. Photo collaboration: Vicente de Mello. (Source: https://www.artsy.net/artwork/marcos-chaves-eu-so-vendo-a-vista)	180
Fig. 15.2	Catalog cover for the MAR’s inaugural exhibition in 2013, <i>Rio de Imagens: Uma paisagem em construção</i> , with a 1910 photograph by Augusto Malta. (Source: https://museudeartedorio.org.br/publicacoes/rio-de-imagens-uma-paisagem-em-construcao/)	181
Fig. 15.3	Cover for Rio’s candidacy book with UNESCO in the “Urban Cultural Landscape” category: <i>Rio de Janeiro: Paisagens entre a montanha e o mar</i> (Ribeiro, 2016). (Source: https://www.terra.com.br/noticias/paisagens-do-rio-de-janeiro-ganham-livro-de-arte,04acf6f2f139ba4e3dbe68a414e0887fun1ez8oi.html)	183
Fig. 15.4	Cover for the <i>RIO+20 Conference Handbook</i> , 2012. (Source: https://www.slideshare.net/uncsd2012/rio20-conference-handbook)	185
Fig. 15.5	Rio’s most scenic view of the Sugarloaf, redesigned with non-recyclable materials, plastic bottles, and other garbage material, by photographer Vik Muniz, during <i>RIO+20</i> , 2012. (Source: https://maisfutebol.iol.pt/internacional/rio-20/incrivel-imagem-da-baia-de-guanabara-do-rio-de-janeiro-feita-com-lixo-reciclado)	186
Fig. 15.6	An evocation, a “mix,” between the authentic landscape and its reinvention by the <i>Rio 2016</i> logo. (Source: https://filateliahalibunani.com/produto/envelope-fdc-999-olimpiadas-rio-2016-rio-de-janeiro/)	187

- Fig. 15.7 Flyer for the book launching *A cidade sou eu*, by architect and urbanist Rosane Araujo (2011). Photography and Photomontage: Rosane Araujo. (Source: <https://www.acidadesoueu.com.br/index.php?page=agenda&id=41>) 190
- Fig. 16.1 Image from live site-specific performance of *Elemental Monsters* (Fish, 2022c) 196
- Fig. 16.2 Drone image from *Elemental Monsters* (Fish, 2022c) 196
- Fig. 16.3 Wind turbines in the background, from *Elemental Monsters* (Fish, 2022c) 197
- Fig. 16.4 Paul Mouginot known as the artist aurèce vettier collecting wind in Tinos. Scene from *Elemental Monsters* (Fish, 2022c) 199
- Fig. 16.5 Underwater scene from *Elemental Monsters* (Fish, 2022c) 199
- Fig. 16.6 Talos as depicted in *Jason and the Argonauts* (1963) and seen in *Elemental Monsters* (Fish, 2022c) 200
- Fig. 16.7 Wind turbine, scene from *Elemental Monsters* (Fish, 2022c) 201
- Fig. 16.8 Panigyri, or traditional summer festival, in *Elemental Monsters* (Fish, 2022c) 202
- Fig. 16.9 Xerolithia, or stone terraces, in *Elemental Monsters* (Fish, 2022c) 202
- Fig. 17.1 Dacha terrain. Dacha Collectives on a slope. Ground view and aerial view. Dacha -community located outside and eastward of Krasnoyarsk, along the Trans-Siberian railroad, station (Pravaya). (a) *The left imageside of the image: A dacha community near Krasnoyarsk. Small land plots are dominated by a small wooden cabin located on a steep slope terrain (kosogor).* (b) *The right side of the image: Zdorovye-Krasfarm dacha community. Dense construction on relatively flat area, commanding access to nearby viewing points over the Stolby Nature reserve.* (Drone photo: Authors) 207
- Fig. 17.2 The dacha community with the wild nature in the back. Screenshot from a drone video. (Authors) 208
- Fig. 17.3 Individual houses. The figure combines several examples of dacha-houses. Individual architectural styles and use of materials, as well as garden planning 209
- Fig. 17.4 Signage and information about the park. (Authors) 210
- Fig. 17.5 Staircase as an interface between the industrial urbanity below and the rurality and nature in the heights 211



Introduction: Vision & Verticality—A More Visual Sociology of the Sky

1

Gary Bratchford and Dennis Zuev

High altitude balloons floating across the United States (US) resulting in claims of foreign interference, billionaire businessmen rocketing into space, and private satellite imagery used to support Ukrainian military intelligence during the Russo-Ukrainian war were some of the biggest news stories of 2022–2023. Such events are a small reminder that the skies, the air, and atmospheres above us are awash with geo-political activity and intrigue.

When we look skywards, we do so somewhat unobjectively. Often, what we see and how we understand what we are looking at is shaped and informed by the various visual cultures that permeate our daily lives. As Alexis Boylan notes, the visual has been incredibly effective in shaping people's understanding of their environment, their pleasures in it, and their threats and obligations to it (2020: 152). With skyward gazing, be that firsthand or via visual representations, what you are experiencing are events, environments and situations that are wrapped in a visual and aural discourse which has often already shaped your understanding of the sky and the layers of

atmospheres above: its excesses, threats, and potentials. This is achieved through a host of visual culture environments from news reports, science-fiction cinema, cartoons, graphic novels, military documentaries, environmental campaigns, as well as advertising, clothing, art, photography, and more. Yet, as Anthony Downey (2022) reminds us, these environments, events, and spaces above our heads are also almost always subject to competing interests—be they national, military-industrial, or economic—that often remain impenetrable to observers.

This relationship between technologically afforded visibility and the analysis of vision, with and beyond the scope of the 'seeing eye', is part of a visual sociology that now encompasses a focus on the assemblage of relations and networks that bring image and vision into being (Zuev & Bratchford, 2020: 109). A relationship between aesthetics and technology that, Luc Pauwels (2015) reminds social scientists, is often easily overlooked. It is at this intersection, between socio-visual thinking, technological relationality and methodologically driven enquiry, that this book addresses the continuing shift in the way social scientists move from a sociology of or through images towards a sociology *with* images to think more routinely about socially stratified and technologically assisted regimes of visibility. In doing so, this volume illustrates how the sky as well as the earth's air and atmospheres remain a surprisingly underex-

G. Bratchford (✉)
Birmingham City University, Birmingham, UK
D. Zuev
CIES-ISCTE, Lisbon, Portugal
University of Saint Joseph, Macau, China

plored domain within visual sociology beyond the largely exclusive framework of drone-related research (Gregory, 2014; Garrett & McCosker, 2017; Greene, 2015; Rae, 2014) and its visual dimensions (Bousquet, 2018; O'Hagan & Serafinelli, 2023; Richardson, 2020; Zuev & Bratchford, 2020).

In an effort to further broaden the scope of visually orientated sociological research in general, but specifically for skyward analysis, this edited volume builds from a specially compiled collection of essays published by *Visual Studies Journal* in 2020. Entitled, *Aerial Visibilities: Towards a Visual Sociology of the Sky*, the collection of essays sought to encourage cross-disciplinary dialogue through a polyvocal exploration of ideas and methods (Harris, 2015) that point to the potential for a post-disciplinary formation of image-studies (Bratchford & Zuev, 2021: 414). Both the special issue in 2020 and this edited volume are efforts to foster a greater plurality of views and frameworks as well as further encourage what Anesa and Fragonara (2021) refer to as the 'peculiarities of different phenomena' within post-disciplinary projects. We argue that complex and multi-dimensional environments like the sky, its atmospheres, and scales of verticality warrant such an expanded visual approach.

With contributions from astronauts, deep-sea divers, artists, architects, sociologists, urbanists, visual culture theorists, geographers, anthropologists and more, this volume asserts how vertical and atmospherically framed socio-visual analysis is beginning to shape and inform how we see and experience urban spaces, travel, leisure, politics and environmental challenges through various prisms, including artistic practices, methodological processes and user-generated content. The above represents work from across the humanities and sciences, all of which foreground visual thinking and visual practice to explore and unpick each contributor's own specific theme or subject. The format of the book includes traditional essay-based chapters and theoretical reflections, visual essays, conversations, and interviews as well as methodological and practice-focused interventions into spaces, landscapes or specific dis-

courses related to studying and participating in image-driven, interdisciplinary scholarship and verticality.

Following Philippopoulos-Mihalopoulos (2016), we intend to bring the sky and air further into the view of visual sociology and argue that there is more to the sky than phenomenological and geopolitical dimensions (Wrigley, 2018; Bratchford & Zuev, 2021; Zuev & Bratchford, 2020). The contributions within this edited collection emphasize the need to further foreground visual approaches to vertical analysis in order to better understand our own complex social and cultural relationship to the spaces, objects, and atmospheres above us. In doing so, this collection foregrounds the visual by asking to what end are images of, or efforts to create images through, vertical registers helping to shape our understanding of an increasingly vertical way of living, moving, and organizing our lives. These vertical registers range from the immediate height above our heads, such as the lowest rung on a street level scaffold all the way through to the limits of our atmosphere as well as what we see and experience at height, looking downwards. Verticality in this regard is, for the purposes of this introductory chapter and our wider conceptual framework, all that is above us, visually, experientially, sensorially, atmospherically. From tall buildings and vertiginous heights, to the air, and the objects which operate in it, such as drones, satellites, and balloons, which provide visual affordances. It is also the volumetric plunges and depths we can experience from positions of elevation. Thus, verticality can be experienced by both an upward and a downward perspective.

This dyad of verticality and visibility owes much to the work of those from other disciplines and practices outside the field of sociology (Elden, 2013; Adey, 2010, 2013; Graham, 2016; Gilbert, 2010; Graham & Hewitt, 2012; Haffner, 2013; Harris, 2011, 2015; Shanks, 2016) to name but some, and in particular, those who now work to bring artists and visual researchers into the conversation (Fuller & Weizman, 2021). Yet, the fact remains that verticality, its politics and associated in/visibilities (including, but not exclusively limited to, work concerning the role

of the gaze and targeting, vertical consumption, and atmospheric analysis) have often been examined by researchers outside the domain of visual studies and perhaps less so via an expansive poly-vocal range of practices, discipline and theories that pivot around sociologically focused visual enquiry.

The remainder of this introductory chapter builds upon our previous, non-exhaustive perspectives on the theme of vision and verticality (Bratchford & Zuev, 2021; Zuev & Bratchford, 2020, 2021) and the work of those who have been instrumental in shaping this ever-increasing field of enquiry across the arts, social science, humanities, and environmental research. As notes above, we begin by probing the subjectivity of images and our response to visual environments, artefacts, and representations in order to help us locate the multiplicity of relationships we have with the sky, space, and specifically the drone-afforded image. In particular, we reflect on our concept of droneviewing (Zuev & Bratchford, 2020, 2021) as a way to intervene in the regimes of visibility that seek to shape and control our perception of politics and political moments. Building from Boylan's (2020) exploration of 'visual culture environments', we focus on the recent COVID-19 pandemic and the possibility for drone-aided performances that speak to indexical, isolated, yet globally recognizable moments and experiences of lockdown, addressed by Lebanese photographer, Rima Maroun in her series, *While Standing My Ground: Self Portraits from Above* (2020). We conclude this section by briefly reflecting on the touristification of vertiginous experiences and gravity through drone-tourist practices and regulatory spaces.

We conclude this chapter by briefly consider two instances of visual/vertical analysis in order to further pave the way for a more open visual sociology of the sky. Contained as two mini vignettes that offer provocations for further investigation, we firstly interrogate the notion of 'aerial eyesores and vertical clutter' in urban environments. We start by focusing on mundane objects like scaffolding as an often in/visible object in the urban environment. We then move to aerial cableways, seen as the future of the urban

transportation, they offer a new and sometimes unique perspective of the vertical gaze. Both scaffolding and aerial cableways invite sociological enquiry as instances of social engagement whilst also shaping and impacting our understanding and experience of the visual-vertical sphere. In the final segment we sketch out the form and format of the volume, which is organized into four thematic sections: (1) Experimental and experiential approaches to volume and atmospheres, (2) Sensing, seeing, and monitoring from above, (3) Assembling and representing: artistic perspectives on volume, vertigo and falling, and (4) Mapping cultural landscapes vertically.

Droneviewing and Visual Environments

I look up at the sky, wondering if I catch a glimpse of kindness there, but I don't. All I see are indifferent summer clouds drifting over the Pacific. And they have nothing to say to me. Clouds are always taciturn. I probably shouldn't be looking up at them. (Haruki Murakami, 2008)

For many people, watching the sky, even if only momentarily, is about escapism and absorption (Bratchford & Zuev, 2021: 420), whilst others look in search of something more spiritual, communicative, and even transactional. As the Japanese author, Haruki Murakami poignantly notes, our human relationship with the sky and atmospheres is part of a long history of physical and phenomenological experiences that have shaped how we look and emotionally connect with the material, symbolic, and metaphoric strata above our heads.

As Stephen Graham outlines, the vast majority of human sensory apparatus is normally centred at the very highest level. We experience life with and through bodies that are particularly vertical and upright (2016: 16). To this end, our own physical uprightness, as well as our vertiginous emotional and spiritual desire to look skyward, are part of a long history that aligns verticality with spiritual, economic, and social power. These notions are even manifest in how some cultures

perceive ascension and loftiness as something to aspire to or compare against, where scale and volume are folded into our everyday concepts of value and success. For example, to look up to someone and to think highly of them are positive affirmations when compared to looking downwards or thinking modestly. These ‘orientation metaphors’ play out in our perception and communication of routine everyday scenarios and situations. The very essence of verticality and vision are embodied and replayed in the way we explore our relationship to one another and the things around us, in the way we grasp and describe abstract societal form, knowledge, and authority. As Davide Deriu stresses (see chap. 11), these experiences also have a sensorial affect which also manifests in physical form. This includes notions of disorientation and vertigo that are fed into the lexicon associated with the precariousness of urban life: terms such as freefall, groundlessness, and suspension are often employed in relation to the vertical growth of cities, and in recent decades have been endowed with wider sociological significance.

To better understand these relationships is to examine these ideas through social interaction, and a multi-sensorial assemblage of visual culture, visuality, and the ways in which vision and verticality impact upon the senses. With emphasis on our visual and experiential relationship to the sky, stratospheres, and atmospheres, this edited volume brings expertise from a cross section of disciplines that foreground vision, visuality, and visibility as ways in which to think through our past, present, and future relationship with verticality. It does so, to better help us understand its value, function, and impact in our personal and shared worlds by examining how vertical spaces and vertiginous senses are represented, imagined, and received. As well as how we assemble a world view that is consistent with what we know and have already experienced, visible, or otherwise. When we do this, we build our own little universes of experience and expectations. To do so, it is useful to think about Alexis L. Boylan’s recognition that the visual is never neutral and thus never without value (2020: xxii). Rather, Boylan notes that the visual is best exam-

ined in *visual environments* and more trickily, *visual atmospheres* (Boylan, 2020: 30). A visual environment, Boylan states, is the space in which we see an object. When we see something, we see what it is around the object, including all that came before it. To this end, all present vision has a past and a future. This is perhaps best explored in David Kendall’s visual essay, *Higher Returns* (see chap. 13), focusing on artist/architectural impressions of speculative and aspirational aerial visions of building projects in the United Arab Emirates (UAE). These ‘visual environments’ offer sensory and atmospheric ‘fictions’, to borrow from Jacques Rancière (2004), to construct a semiotic space in which a seductive lifestyle might exist. By contrast visual atmospheres, Boylan writes, have definition and clear boundaries yet this is not apparent in our day-to-day experience of them; we often cannot detect the contours until we have left the atmosphere (Boylan, 2020: 30). Writing about visual culture as ever-present, natural, and sustaining, like the ‘air we breathe’, we can also become aware of what it denies us. To this effect, the environments, and atmospheres in which the visual operate, can have a ‘totalizing’ effect on us, our identities, and bodies.

Such totalizing effects are perhaps best articulated by Lebanese photographer, Rima Maroun’s 2020 drone-photography project, *While Standing my Ground: Self Portraits from Above*. An auto-referential visual record of the photographer’s own isolated experience of the May 2020 COVID-19 lockdown in Lebanon and the adjoining catastrophe that was the Beirut port explosion in August of the same year. Throughout 2020 and 2021, the image of crisis was manifold. At a macro level, photos of environmental and ecological disasters jostled for attention next to others that visualized, in one way or another, the ongoing COVID-19 global pandemic. For the latter, the dominant meta-iconography of COVID-19 was empty cities and the ubiquity of the surgical mask. At a micro level, COVID-19 and its impact on our daily lives offered numerous spaces for enquiry, introspection, and reflection which gave rise to an emphasis on family, community, care, individual and collective connection, intimacy,

and intimate space (Pixley, 2021: 106). In many ways, Maroun's photographic series touches on many of these macro and micro topics.

Located directly beneath her drone camera, Maroun lays on the tiles of an empty and seemingly disused and unfinished private swimming pool. Looking purposely towards the lens of the drone (see Fig. 1.1), our eye is drawn to Maroun. Dressed in black, palms facing upwards, she is a miniature figure consumed by the aqua blue tiles beneath her.

Throughout the series, this purposeful and reciprocal encounter is repeated. The drone records Maroun's singular and isolated presence,

always dressed in black, palms upwards, mask on in a variety of locations that range from natural environments to urban disasterscapes. In each image, Maroun's surgical face mask signals to the observer that these images belong (or refer) to a very specific epoch of time. By looking back at the camera, Maroun's gaze challenges the often-asymmetric relationship we have long had with aerial photography. In doing so, this engagement with the drone provides a 'spatial testimony' (Keysar, 2018) that can bring incongruous and inscrutable spaces into dialogue (Fish et al., 2017) through the practice of droneviewing (Zuev & Bratchford, 2021) as a new visual grammar afforded through strategic/artistic drone use as a specific mode of vertical/visual commentary on popular events and social crises (Bratchford & Zuev, 2021).

To produce photographs from directly above is to reduce the intimacy one might have with the space in the frame as well as the subject, but because of this unique perspective, so too can it invite further consideration and debate (Zuev & Bratchford, 2020). Using the photojournalistic work of Rocco Rorandelli and the use of drones by activists during 2016 Standing Rock protests in North Dakota, USA, we have previously argued that the considered, strategic and performative use of drones can redefine how we are invited to examine a host of topics by using volume to reframe and, often reenergize our vision and interest in the issue at hand.

Maroun's work, like many we will see in this volume, provides stimulating examples of the way in which droneviewing is a catalyst to intervene in the regimes of visibility that seek to shape and control our perception of political situations and culturally significant moments. The use of drones and volumetric vision, facilitated through social media platforms such as Instagram, help us to think about notions of self-representation and the performative communication of emotions, belief, and anxieties, specifically in relation to spatial practices, that would otherwise not carry the same visual cache or significance had the camera been placed at a horizontal rather than overtly vertical plane.

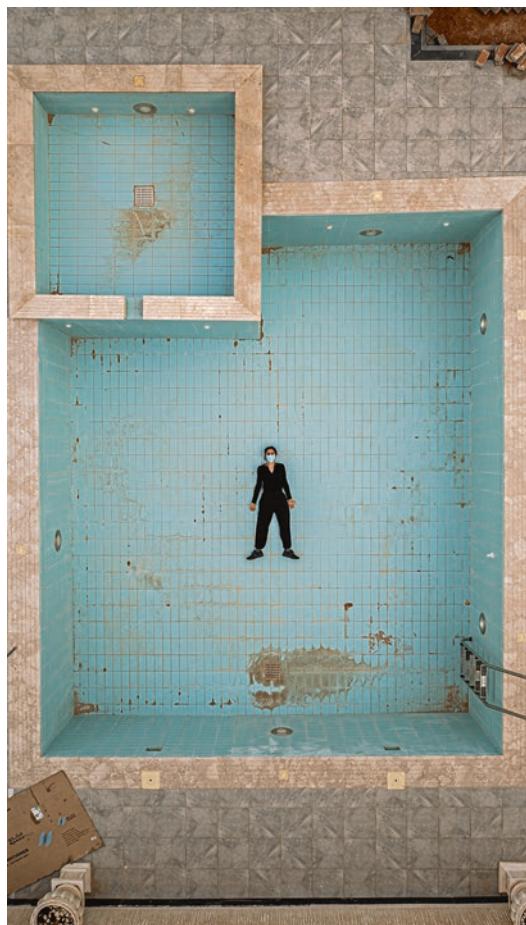


Fig. 1.1 Rima Maroun in an empty pool, Lebanon 2020 from the series, While Standing my Ground: Self Portraits from Above (2020)

Tourist Droneviewing

The use of drones by tourists remains the least explored aspect of the droneviewing assemblage. The number of leisure drone operators is increasing, and national tourist boards and international tourist agencies are increasingly using drone footage for the marketisation of various destinations. In this section we would like to emphasize two important points that are related to tourist droneviewing practice, and which have been largely omitted in the literature on drones and the tourist use of them.

Firstly, droneviewing practice is no longer a tourist gaze, but a multi-sensorial and elementally sensorial performance and is part of the larger (socio-cultural-techno-legal) assemblage including national and regional regulations, which impact the ways drone tourists will travel or experience the destination, making it markedly different from ‘regular hand-held’ tourist photography. One defining difference is the way that drone tourists create the visual scape of the space and also, at times, generate a sense of risk in their imagery by transgressing into regulated spaces/sites. While some holiday destinations promote droneviewing, other destinations, specifically national parks and wilderness areas, are restricting the use of drones due to potential environmental impacts. For instance, the International Association of Antarctica Tour Operators (IAATO), a key organization that advocates and promotes for the practice of safe and environmentally responsible private-sector travel to the Antarctic, had considered prohibiting any use of recreational (tourist) drones in Antarctica, while the use of drones for documentary filmmaking and research is allowed. One of the explanations is linked to the nature of the Antarctic tourist experience—the fact that many Antarctic tourists are preservationists, who are coming not only for a visual experience of the Antarctic environment (Zuev & Picard, 2015) but something all-together more firsthand and proximate.

While in general terms, technologically enhanced viewing is still the primary experience of tourist drone flying, the practice is, for some at least, enhanced by the thrill or anxiety of finding

a good place for taking off as well as landing and piloting through the elements, especially wind, water, and aerial obstacles (cables, trees, birds). Thus, drone flying and taking a picture or making videos is an elemental performance (see Fish et al., 2017), and often a purely semiotic analysis of the process will not fully reconcile with the experience at hand. For some, it is an embodied and multi-sensorial experience. For an explicitly urban drone tourist experience, we can look at Ole Jensen’s idea of ‘staging mobilities’.

For Jensen (2013), staging is a way of understanding everyday life situations, in terms of dynamic and complex mobility practices. These mobility practices take place in material sites and often amongst complex infrastructures by and with people, that have to consider the regulations and the design of urban space, and its architectural form. Not only are drones rapidly changing tourist gaze practices, so to is the space in which the drone user operates. In a similar vein, one might also think about the global subculture of rooftopping. Rooftopping is the practice of gaining access to the top of cranes, disused chimneys, bridges or the roof of skyscrapers, where scaling the heights, often illegally, is done with an ultimate goal of producing vertigo-inducing selfies. Ascending the vertical structure for a photo is not only a stunt justified by the accumulation of potential likes on social media (and money), but a form of thrilling exploration of the small ledge between life and death and a way of reclaiming the vertical space of the city (Zuev & Bratchford, 2021).

Like rooftoppers, we must think about the performance of certain drone tourists and their interaction with the urban environment as a kind of affective visual/vertical thrill seeking. Avoiding crowds of people to enhance the scene of the desired shot, seeking out more privacy and avoiding security guards in order to get their most desired aerial footage. Thus, these practices of tourist droneviewing by common tourists differ depending on the time, location, and regulations. As some “drone tourists” suggest in their blogs, they arrive early to avoid crowds, and normally take off in a park near the object they want to shoot from the drone. In particular, rooftops have

become the preferred take off location as it changes the privacy setting for the tourist and gives a different line of sight. The fact that the rooftop is also the preferred location of snipers in the urban landscape makes the drone tourist's performance resemble the sharp-shooter's logic of height and obfuscation vis-à-vis the sight (eyes on) and rules of engagement with the subject, contributing to an understanding of drone viewing as a practice of everyday militarism (Richardson, 2020). The performative aspect of tourist photography is emphasized in Tourist Gaze 3.0 (Urry & Larsen, 2011), however it misses the crucial performance of the modern self-contemplating tourist—*the selfie* (or dronie) which becomes a central aspect of drone tourist practices and will undoubtedly continue to warrant consideration, specifically in terms of legislative practices.

While drones are already becoming a nuisance in the air, in the next section we will speak about a different phenomenon of vertical eyesores—aesthetically unpleasing or disturbing elements of urban environment, that are either made invisible or have not been given due scholarly attention as vertical phenomena.

Vertical Eyesores: The Case of Scaffolding and Aerial Cableways in Urban Environments

When we think about vertical structures, specifically in urban environments, the scholarship and design discourse, amongst urbanists, sociologists, architects and planners, usually turns to buildings or monuments. However, the object that helps to construct these very buildings is often seen as provisional, minute, and unworthy of attention. One such mundane element of this urban, verticality context is scaffold. A temporary structure, scaffolding, provides access to and a platform for construction work and activities performed above ground (Yin & Caldas, 2022). An obvious description, but as Yin and Caldas recognize in their paper, the focus on scaffolding (at least as far as industrial construction projects are concerned) 'is

very limited' (2022: 2555) citing only one other paper in their literature survey (see Kumar et al., 2013). Across the academy, scaffolding has been given little to no attention, yet sociologically, scaffolding in super vertical cities like New York and Hong Kong provides fertile ground for the analysis of social and cultural interaction. Their ever-present occupation somewhere on the streets of New York is a result of local legislation. After an accident in 1979, New York City adopted a law that required building facades be inspected regularly; under the law's current incarnation, buildings over six stories must be looked over every five years (Green, 2021).

There are an estimated 280 miles of scaffolding occupying New York City at any given time; it is something pedestrians encounter every day. With 9000 active scaffolds or 'sheds' and an average lifespan of 300 days per unit, New York scaffolding takes up over 1,000,000 linear feet of space, multiplying the average height of the sidewalk by 70 ft (Guan, 2022). It could be argued that scaffolders do more than any other group of people in New York to alter the landscape. A mesh of lines and lofty passages, the scaffold is a bricolage of sorts, a space that offers different things to different constituents at different times. Its fixity and temporality are limiting, yet the space and environment it provides foster a multiplicity of uses, encounters, and events. The scaffolded sidewalk creates a space for mini worlds of intersubjective encounters where people and ideas meet. While some shelter beneath it, others lean, wait, exercise, use it to conduct business or as temporary storage (Fig. 1.2). These semi temporary spaces can temporarily change our behaviour. Moreover, shop owners or local residents transform these spaces into places, painting them specific colours or adoring them with flags to signify their support for specific campaigns or to memorialise days of national celebration. While steel scaffolding braces buildings across the western hemisphere, in South China, and specifically in Hong Kong, bamboo remains the key material for scaffolding used during the construction of high-rises. A less ridged skeleton, bamboo poles, now often mixed with steel rods, rise up to

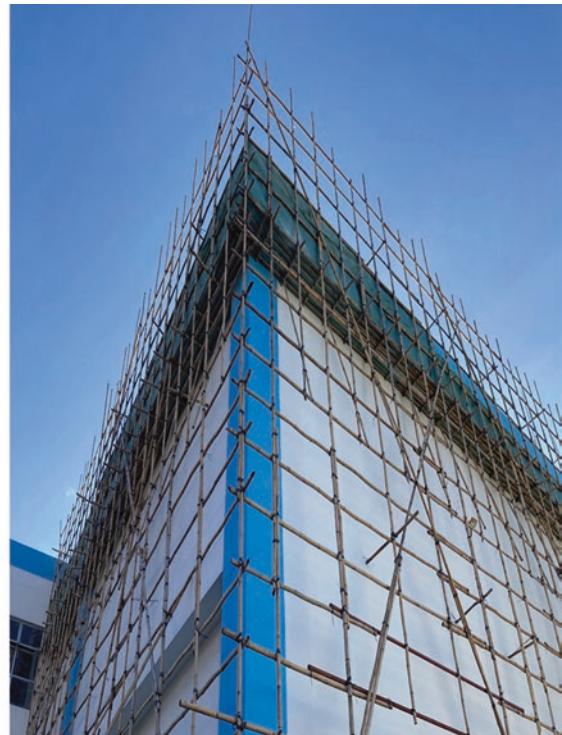


Fig. 1.2 Ladders secured to the scaffold. New York. 2020. Bamboo scaffolding used together with plastic as a temporary shield during reconstruction of a historical landmark in Macau. 2022

the sky and often sway with the wind; their aesthetic is more organic and natural.

As cities get smarter, aesthetic-driven innovation is never far behind. The Urban Umbrella company provides bespoke street furniture that replaces the usual semi-permanent industrial scaffolding of New York and other North American cities. Glossy, powder-coated white poles with in-built LED lights are up-market alternatives to the traditional grey metal poles used in everyday construction. Erected outside exclusive, high-end fashion stores like Balenciaga and Louis Vuitton as well as private members clubs in New York, these alternative structures ‘are designed to catch the eyes and pull them upwards towards the sky, provoking feelings of openness’.¹ This consideration for beckoning and directing the gaze of urban pedestrians is wrapped into a wider curatorial effort to perform luxury.

As the climate crisis continues to unfold, the diversification of aerial cableway companies keeps apace. Those who once provided ski resorts with aerial ropeways are already preparing. They are diversifying into urban environments by selling more cable cars to cities rather than exclusively to the skiing resorts for one important reason: there is less snow available and less people who can go skiing. With multiple resorts closing, or instead promoting biking trails or moving their ski runs to higher elevations (Wall Street Journal, 2023 and personal communication with aerial cableway company executives (2023)). The cable car, like the scaffold, provides a site of sociological enquiry that is driven by an understanding in the way in which we both see and relate to its presence in a specific place and the various ways it is put into use.

At the same time, urban aerial cableways have been hailed as a mode of transport that has saved many cities, specifically in Latin America—Bogota, Rio, La Paz and Medellin to name a few.

¹<https://www.urbanumbrella.com/ourdesign>

Cheap to maintain and with a low ecological footprint, cableways are typically installed in cities when access between specific topographies (and communities) are prohibitive. Cableways allow fast access to those from the higher lying (and often poorer) neighbourhoods to the city centre (Fig. 1.3).

However, as Freire-Medeiros et al. (2020) and other scholars argued earlier—aerial cableways have their own dark sides. They may become eyesores—aesthetically unpleasing artefacts, which also rob privacy from the residents over whom the cable cars pass whilst creating constant noise. High-wire gondolas might also seem a bit too dystopian as the transportation goes higher above the ground (first via elevated highways, flyovers) and now aerial cableways. While cableways alleviate ground-level traffic jams, their inclusion into cities in general poses a further question—do they add to the existing vertical clutter? The experience of aerial gondolas serving tourists and residents have in the past

often become signifiers of failure rather than facilitators of access or tools of progress, as was the case of Emirates Air Line in London, UK (Guardian, 2022). However, as global cities are approving aerial tramways,¹ we will witness a change in our vertical or volumetric gaze as the space above our heads is corporatized and diversified as more vertical—volumetric cities develop.

The two phenomena mentioned above are examined in conjunction with four extra thematic parts that form the core of the edited volume.

1. Experimental and experiential approaches to volume and atmospheres
2. Sensing, seeing, and monitoring from above
3. Assembling and representing: artistic perspectives on volume, vertigo, and falling
4. Mapping cultural landscapes vertically

In the following pages we discuss how these different frameworks build towards a multi-dimensional and cross-disciplinary approach,

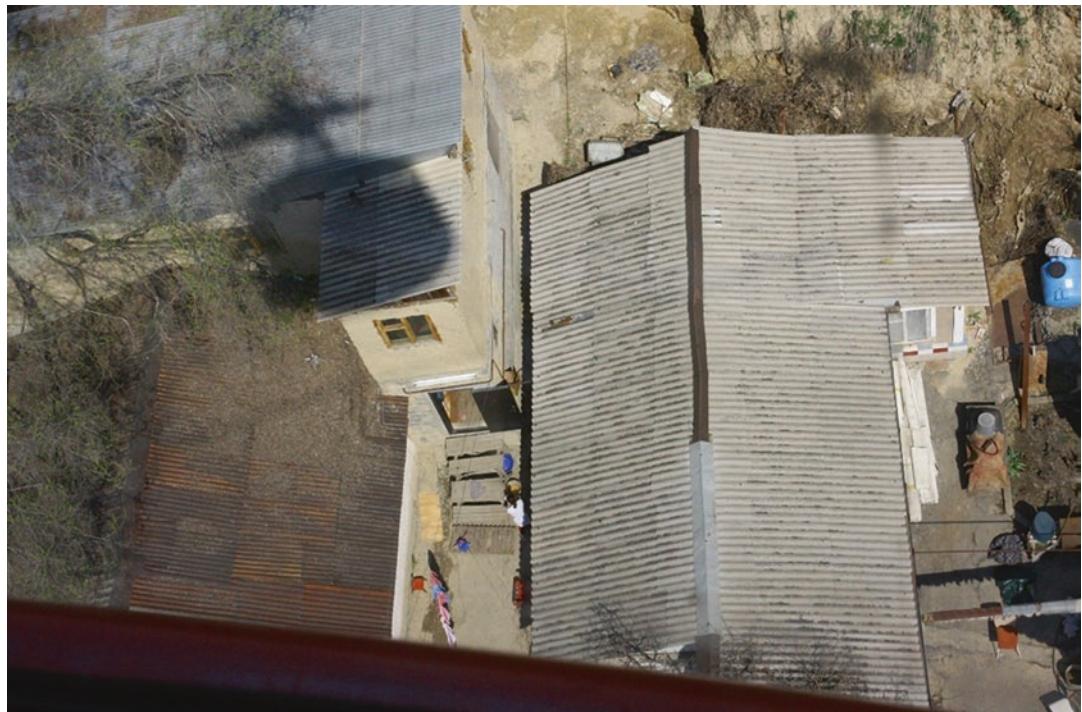


Fig. 1.3 Courtyard seen from the tourist cable car gondola in Almaty, Kazakhstan, 2011. The moving shade of the overhanging gondola itself is a continuous reminder to the residents of extraneous objects and strangers above their heads

exploring and experiencing verticality visually. Individually, each section is a snapshot of how different artists, scholars, researchers and communities of practice think, explore, and reflect on the vertical or notions of ascension and its physical and atmospheric qualities, as well as its social, cultural, organizational, technological and economic impact.

Part I. Focusing on experimental and experiential approaches to volume and atmospheres, part one begins with a contribution by Open-Weather, a feminist experiment in imaging and imagining the earth and its weather systems using DIY community tools. Co-led by researcher-designer Sophie Dyer and creative geographer Sasha Engelmann, Open-Weather encompasses a series of how-to guides, critical frameworks, and public workshops on the reception of satellite images using free or inexpensive amateur radio technologies. In the tradition of intersectional feminism, Open-Weather investigates the politics of location and interlocking oppressions that shape our capacities to observe, negotiate, and respond to the climate crisis. In doing so, Open-Weather challenges dominant representations of the earth and environment. Open-Weather's reflexive-critical contribution, defined here as a preamble, functions as a situated essay that speaks to the project at large and the community of Open-Weather. Akin to an essay in an exhibition catalogue, the *Open-Weather Feminist Handbook Preamble* invites the reader to see the project from a critical, one-step-removed perspective. The logic of a community of practice, reflection, and dialogical exchange within the context of experimental and experiential processes are at the core of Part I. From expansive global networks to intimate dialogues, part 1 moves to a three-way conversation between astronaut Jean-François Clervoy, choreographer Jeanne Morel, and visual sociologist Julie Patarin-Jossec entitled *Of Carnal Gravity: A Three Voice Conversation*. Which focuses on the embodied and sensorial aspect of verticality from three unique perspectives. Clervoy is a European Space Agency/NASA astronaut and founder of a parabolic flight programme in France (Novespace-AirZeroG), who had the opportunity

to visualize the Earth from outer space. Morel is an interdisciplinary artist who dances in extreme environments and creates immersive artworks with the new media artist Paul Marlier. Patarin-Jossec is a sociologist by education, a photographer, and professional diver who occasionally also pilots light aircrafts. Neither Clevoy, Morel, nor Patarin-Jossec's experiences can be defined by a single activity, and through their work and explorations around and above the world, they all had different, if not radical, experiences of verticality from outer space to the ocean's depths—and everything in between. Intertwining art practice, air and spaceflight training, and underwater sensations, their conversation is a three-voice meditation over the sensible and aesthetical ways to apprehend verticality/ies. The verticalities experienced (and experimented with), as unveiled in this interview piece, are inextricably connected to gravity and weightiness. Not only an order imposed to living things by nature, not exactly an inevitable condition, but often a source of inspiration and carnal liberation, these varying verticalities reveal embodiment processes and a relation to senses, movement, and technologies, where leaving the terrestrial ground can lead to the need to retrain bodies and mentalities. Here, discussions of weightlessness, vision, and verticality are entwined across three experiences. As Clevoy notes, verticality can be visualized, endured, rationally defined, and played with, yet with vertigo, it is about the disposition of falling. In weightlessness, when you look at the Earth from outer space, you don't feel any vertiginous attraction towards the Earth—Earth simply becomes an object among others in your landscape. No force is exercised to give you the feeling you're getting closer or farther from this object. This is why the notion of verticality disappears in weightlessness. Social theorists, Andrea Brighenti and Andrea Pavoni, take a more abstract and conceptual level approach to vertical topography, with specific emphasis on the contemporary city. They suggest applying the concept of *survol* by Raymond Ruyer, that corresponds to a synthetic vertical vision. For the visualizations of *survol* we are invited to follow the artworks by Stanza to better understand virtual verticality

through drones as well as non-visual digital networked infrastructures. In doing so, the authors argue that living in a society of promisingly seamless, and programmed environments, generates a tension, where the more we see, the less we know. Lastly, this section finishes with another three-way discussion with Stephen Graham, Gary Bratchford and Dennis Zuev. The conversation takes a multi-disciplinary approach between visual theory and critical/urban geography to examine the way in which we see cities and the ways in which cities are made visible. Through our exchange we invite Graham, a Professor of Cities and Society, to reflect on the vertical/visual dynamics that have shaped the way we visually understand, experience, and imagine urban environments through a vertical lens. This focuses on atmospheres and the manufacturing of atmospheric inequalities, war, drones, satellites, and a final note on the future of skyward analysis and sociological thought.

Part II, *Sensing, Seeing, and Monitoring from Above*, emphasizes the intersection between technology, politics, power and visibility in various arenas and begins with two traditional academic essays. For design theorists Paul Cureton and mobilities scholar Ole Jensen, drones can be seen as key epistemological devices—or “theoretical objects” through which we can sense, see, monitor, and capture reality. As Cureton and Jensen argue, we need to reposition drone sensing for landscape and urbanism planning in regard of three phases: precision capturing, capturing invisible mobilities and the post-processing phase. While this process of three phases is applied by the authors to landscape and urban planning, it can have much wider implications. In Anna Jackman chapter’s *Vocabularies of Drone* sensing, Jackman suggests that we are in the midst of a global turn to the drone. From their establishment as icons of war, drones are increasingly deployed in a range of more-than-military applications, Jackman argues that the increasing engagement with the concept of volume helps to (re)consider understandings of space and/which has lasting value for various sectors. This chapter explores drone sensing volumes and the diverse visualities, practices, and the relations they com-

pose and comprise. The chapter turns to the example of drone sensing in the aftermath of nuclear disaster, understanding this as both a volumetric and sensing project inviting further attention to the vocabularies deployed in critical accounts of droning and volume alike. While extant work draws essential attention to conflict, control, and calculation across aerial, watery and subterranean volumes, Jackman argues that there remains a focus on military and state-led intervention and action therein. Jackman’s chapter presents an account of a drone sensing sensibility that seeks to resolve rather than perpetrate volumetric violence. The format of Lewis Bush’s chapter reflects his research-driven art practice. Focusing on his recent project *Depravity Rainbow* (2023), Bush’s visual essay *Viewing from Where? Satellite Imaging and the Politics of Space Technology: Unpacking Depravity’s Rainbow* draws from Science and Technology studies to argue for the importance of artists and researchers to think critically about the origins of the technologies they research and use. By conducting a technological genealogy of sorts, Bush traces back through the history of rocketry and early space exploration to think about how the circumstances of their creation might continue to influence their present application. Focusing on contemporary rocketry and satellite mapping, Bush highlights how such technologies were shaped by anti-democratic, anti-humanity impulses, the former in the context of the Second World War and the Holocaust, and the latter in the early days of the Cold War. Starting with a discussion about definitions and the politics of technology, Bush folds this critical position back into a reflexive analysis of two-long-term creative works, which examine the aforementioned technologies in order to open dialogue around creative practice research and military technologies repurposed for civilian and scientific application which still retain aspects of their original usage. The final contribution of Part II comes from visual culture theorist, Anthony Downey, entitled, *The Algorithmic Apparatus of Neocolonialism: Counter-Operational Practices and the Future of Aerial Surveillance*. Divided into five critical provocations, Downey’s elucidation

tive commentary looks at how the technological developments afforded by Artificial Intelligence (AI), algorithms, and machine learning increasingly guarantee autonomous systems of surveillance and warfare are recalibrating the relationship of subjects (targets), digital images (specifically, the data extracted from them), and vertical models of drone warfare. To address these and other concerns, Downey focuses on Shona Illingworth's three-screen video and sound installation *Topologies of Air* (2021) and the *Airspace Tribunal* (2018–ongoing), the latter being a series of in-progress “people’s tribunals”, as a starting point for a broader enquiry into the algorithmic rationalization of time and space and human rights. In section one and two, Downey probes whether the interpretive and heuristic context of practice-based research, operating as it does from within the methodological framework of visual cultures, identifies and distinguishes the impact of satellite surveillance and drone reconnaissance on the realities of life and, increasingly, death. The third segment observes how the future of war has been categorically programmed into algorithms that remain, at best, resistant to critique. While section four highlights the extent to which we need to see the evolution of algorithmic apparatuses from both within and through the sinuous, utilitarian, and extractive technologies of historical forms of colonization—specifically, how they have informed the neocolonial annexation of present-day realities. Downey concludes by stressing that such practices are now inevitably realized through the application of advanced surveillance systems, drone-led infractions of international law, and the logic of algorithms with advanced AI systems.

Part III of the book, *Assembling and Representing: Artistic Perspectives on Volume, Vertigo and Falling*, offers elements of interplay between the sections that have come before it. Following on from Cureton and Jensen in Part II, Francisco Klauser also approaches drone-mediated aerial gaze and suggests that we can reconsider the punctual, linear, and planar forces inherent in the politics of visibility. As the language or grammar of aerial visibility is still emerging, the terminology of points, lines and

planes examined within the abstract paintings of Wassily Kandinsky could be an initial starting point for designing the metaphors that can help to make sense of drone and information technology mediated encounters. The ideas and metaphors of abstract painters can be inspiring visual concepts when applied to the new realities of sensing machines and hi-res pictures facilitated by robots. In the following chapter, entitled, *After Falling Away: Reflections on a Vertiginous Art Exhibition*, Davide Deriu explores the emotional and physical abyss of the vertical topography of the city which dives, falls away, and emerges from the vertiginous spaces or urban environments that make us dizzy—the experience of a tall, multi-story megapolis rising into the sky. The search of equilibrium in the terrain with apparent loss of grounding is key to this critical framework and is reflected in the approach to the exhibitions that are described (see chap. 11) and in more detail in his recent book (Deriu, 2023). Vertigo is one of the essential characteristics of modern life, with everlasting uncertainty and chaos, desire of elevation and anxiety of falling. Ultimately, the sensation of dizziness is what aptly describes the rapid vertiginous transformations of our cities.

The remaining contributions to Part III include a visual essay and an artists provocation for imagined vertical geographies. Firstly, Portuguese artist, Ana Aragão presents us with depictions of skyscrapers as unique lifeforms. Rather than simply material embodiments of capitalism, Aragão’s skyscrapers are levitating structures full of the minutiae of individual lives in a massive and unreachable abyss above the ground. Each figure/drawing in the essay of imaginary skyscrapers is a type: a flying machine, a cathedral, a walking pyramid and so on. Each building in this imaginary architectural exercise is a narrative of a dream, at the same time an abstract instance of mundane vertical housing. The imaginary skyscrapers are not only the fruit of the artist’s fantasy, but they could also be projections of vertical beings in the future (or already existing forms of vertical beings in the present). These figures are not entirely fictional (the author drew great inspiration from the density of Asian cities, specifically Macau and Hong Kong). Imaginary skyrises

are a powerful artistic metaphor. Here we are reminded of Palestinian artist, Larissa Sansour's 2013 project, *Nation Estate*. In Sansour's arabfuturistic "visionary fiction" (Kapadia, 2019) she presents Palestine as one high rise building with multiple floors reserved for specific Palestinian cities or areas from Gaza to the West Bank. Speaking to the fragmented and discontinuous nature of the Palestinian landscape and it's ever decreasing territory, *Nation Estate* redefines Palestinian movement as a wholly vertical experience facilitated by a central elevator. Again the elevator becomes a potent metaphor, and a mundane object that eludes much scholarly attention) but represents a powerful agent in the sociotechnical assemblage in vertical mobility. The skyscraper in Sansour's work is not a stigmatized social housing estate or a squatted building but a liberating edifice, that provides refuge to the Palestinians stuck in the horizontal web of checkpoints and bureaucracy. The final contribution is from the photographer and researcher, David Kendall. Entitled *Higher Returns*, Kendall's experimental visual essay explores how the historical photographic process of cyanotype printing merges seamlessly with Computer Generated Image (CGIs) scans. Focusing on archival material used to render visible prototype skyscrapers from UAE, Kendall's cyanotype chemical experiments, reproduced for this essay, along with a critical-reflexive essay, play with the ambiguous hybrid material form of the architectural blueprint used to render UAE's imagined hyper-skyline. Through this, Kendall generates new analogue pictures of digital settings that embed and subtly suggest the possible presence of a modern cityscape that is neither fixed nor fluid.

The final section of this book, *Mapping Cultural Landscapes Vertically*, does so through mixed methods and modalities. Brazilian scholars Leo Name and Bianca Freire-Medeiros take us from the imaginary to the real and continuously emergent vertical vortex of rooftops, adjacent buildings, and passages in Rio de Janeiro. From Cureton and Jensen's analysis of the drone as an epistemological device for questioning verticality and visuality to another epistemological construction—the *laje (rooftop)* of Brazil's urban

favela. For townships with multiple connotations (Freire-Medeiros, 2009), the favela is a largely autonomous/informally constructed part of the city. Focusing on a specific architectural feature in the favela—the upper part of the residential structure—the authors use of informal fieldwork practices, including vernacular photography and ethnographic walking methods, to map spaces of social and cultural distinction between different groups of residents, and ownerships of a *laje*. A symbol of distinction and privilege, within a complex social system, the *laje* is a space to perform status through mundane practices like sunbathing and partying. While a *laje* is an open rooftop space, not often entirely visible in the dense architecture of the favela, one needs a loftier position, often produced via the aerial cable car. The following visual essay from Jorge de La Barre focuses on a different Brazilian structural icon: Rio de Janeiro's Sugarloaf Mountain. Examining early photographic works on natural landscapes in the late nineteenth century, to contemporary visual representations involving mega-events, urban renewal and city-branding, de La Barre posits that Sugarloaf Mountain has come a long way in staging its natural, vertical monumentality, an argument de La Barre makes through recent photographic contexts in which Rio's "natural born monument" has been used to promote the image of Rio as the "Marvelous City". The penultimate chapter, a reflexive visual essay by cultural anthropologist, Adam Fish looks back upon his 2022 experimental drone documentary *Elemental Monsters* which investigates the tense relationship between the power of wind to make electricity and the power of the Greek island of Tinos. Deploying the drone to document the ecological impact of wind turbines, Fish asks, in this world in which humans appear to dominate the earth, create climate, affect the temperature and cycles of the ocean, how do the elements, specifically wind, shape our everyday experiences of landscapes? On Tinos, Fish suggests that the wind will tell you. As researchers we may document the wind, funnel it to a purpose, but like other elements of the sea, magma under the earth, the gravitational roll of rocks, and the meandering of mountains, the wind is

beyond our control. The wind is an element that constrains but also enables. It is a force that can be channelled. It enables action. But for whom? Adam Fish's site-specific work, which sits within a wider body of drone-related and ecologically rooted enquiries whereby the drone is the methodological tool, points to tensions in human and technological relationships with the earth. Our final contribution is by Artem Yakovlev and Dennis Zuev. Their visual essay, *Revitalization and Touristification: The Vertical Cultural Landscape of Dacha Communities in Siberia*, focuses on a dacha community in the Siberian city of Krasnoyarsk. A unique type of built environment, ubiquitous across post-Soviet Russia, dacha plays a significant role in Russian culture, yet it lacks scholarly investment in terms of understanding its importance within a discourse of vernacular heritage. Using a drone as a tool of vertical-visual ethnography Yakovlev and Zuev focus on the mountain-side Polden-park project in Krasnoyarsk. In doing so, they suggest that the transformation of the dacha community is part of a specific form of rural revitalization and tourism-driven gentrification that is related to expanding touristification of verticality and heritage sites as a sightseeing experience..

Towards a More Visual Sociology...

In our initial collection of essays on this subject, *Aerial Visibilities: Towards a Visual Sociology of the Sky* (Bratchford & Zuev, 2021), our intentions were to bring vertical and aerial analysis into the sphere of visually focused sociological discourse. A scoping exercise of sorts, the collection and the thinking that underpinned its contributions was richly interdisciplinary. Approaching a field of study that has largely been the domain of geographers, architects, ethnographers and technologists, the emphasis was, as our titled suggested, to move towards a visual sociology of the sky. As outlined, interdisciplinarity and discursive polyvocality is at the core of our project. This volume is the conduit for these overlapping and varied conversations. As editors, we are the facilitators. To this end, we lean into Derek Conrad Murray's

call for visual scholars to use the affordances and critical space within visual studies to [continue to] foster a renewed culture of collectivity and vibrant exchange, in order to help navigate the complexities and challenges of the twenty-first century (2021: 177). By pulling together these varied approaches we further embark on our aim to now purposefully move towards a '*more visual*' sociology (Pauwels, 2015; Grady, 2017: 200; Henny, 1986) of the sky.

References

- Adey, P. (2010). Vertical security in the megacity: Legibility, mobility and aerial politics. *Theory, Culture and Society*, 27, 51–67.
- Adey, P. (2013). Air/atmospheres of the megacity. *Theory, Culture & Society*, 30(7–8), 291–308. <https://doi.org/10.1177/0263276413501541>
- Anesa, P., & Fragonara, A. (2021). *Post-disciplinary approaches to discourse analysis*. Palgrave Macmillan. https://doi.org/10.1007/978-3-030-70091-1_1
- Bousquet, A. (2018). *The Eye of War: Military Perception from the Telescope to the Drone*. Minnesota: University of Minneapolis Press.
- Boylan, A. (2020). *Visual culture*. MIT Press.
- Bratchford, G., & Zuev, D. (2021). Aerial visibilities: Towards a visual sociology of the sky. *Visual Studies*, 35(5), 402–416.
- Bush, L. (2023). *Depravity's Rainbow (2018–2022)*. Disphotic Editions.
- Deriu, D. (2023). *On balance: Architecture and vertigo*. Lund Humphries.
- Downey, A. (2022). *Calculating skies: Topologies of air and the Airspace Tribunal, The MIT Press Reader*. Retrieved January 25, 2023, from <https://thereader.mitpress.mit.edu/calculating-skies-topologies-of-air-and-the-airspace-tribunals/>
- Elden, S. (2013). Secure the volume: Vertical geopolitics and the depth of power. *Political Geography*, 34, 35–51.
- Fish, A., Garrett, B., & Case, O. (2017). Drones caught in the net. *Imaginations*, 8(2), 74–79.
- Fuller, M., & Weizman, E. (2021). *Investigative aesthetics: Conflict and commons in the politics of truth*. Verso.
- Freire-Medeiros, B. (2009). The favela and its touristic transits. *Geoforum*, 40(2009), 580–588.
- Freire-Medeiros, B., de Mattos, L., Rocha, J. F., & Name, L. (2020). Of cable-cars and helicopters: Mobility regimes and the politics of visibility in the favelas of Rio de Janeiro. *Visual Studies*, 35(5), 478–488. <https://doi.org/10.1080/1472586X.2020.1840099>
- Garrett, B. I., & McCosker, A. (2017). Non-human sensing: New methodologies for the drone assemblage. In G. E. Cruz, S. Sumartojo, & S. Pink (Eds.), *Refiguring*

- techniques in digital visual research* (pp. 13–23). Palgrave.
- Gilbert, D. (2010). The three ages of Aerial Vision: London's Aerial iconography from Wenceslaus Hollar to Google Earth. *The London Journal*, 35(3), 289–299.
- Grady, J. (2017). Reframing visual social science: Towards a more visual sociology and anthropology by Luc Pauwels. *Visual Studies*, 32(2), 200–204. <https://doi.org/10.1080/1472586X.2017.1320088>
- Graham, S., & Hewitt, L. (2012). Getting off the ground: On the politics of urban verticality. *Progress in Human Geography*, 37, 72–92.
- Graham, S. (2016). *Vertical*. Verso.
- Greene, D. (2015). Drone vision. *Surveillance & Society*, 13(2), 233–249. <https://doi.org/10.24908/ss.v13i2.5346>
- Gregory, D. (2014). Drone geographies. *Radical Philosophy*, 183. January–February.
- Green, P. (2021). Our lives, under construction. *The New York Times*. Retrieved November 18, 2022, from <https://www.nytimes.com/2020/01/02/style/scaffolding-new-york-city.html>
- Guan, S. (2022). *Urban vine. Reimagine the scaffolding as a repair opportunity to transform the ecosystem*. Masters Theses. 932. <https://digitalcommons.risd.edu/mastertheses/932>
- Guardian, The (2022). Boris Johnson's Emirates Air Line cable car fails to find new sponsor. <https://www.theguardian.com/business/2022/feb/27/london-cut-price-hunt-for-a-cable-car-sponsor-emirates-boris-johnson>
- Haffner, J. (2013). *The view from above: The science of social space*. MIT Press.
- Harris, A. (2011). Vertical urbanism: Flyovers and skywalks in Mumbai. In M. Gandy (Ed.), *Urban constellations* (pp. 118–123). Jovis.
- Harris, A. (2015). Vertical urbanisms: Opening up geographies of the three-dimensional city. *Progress in Human Geography*, 39(5), 601–620.
- Henny, L. M. (1986). A short history of visual sociology. *Current Sociology*, 34(3), 1–4. <https://doi.org/10.1177/001139286034003003>
- Jensen, O. (2013). *Staging mobilities*. Routledge.
- Kapadia, R. K. (2019). *Insurgent aesthetics. Security and the queer life of the forever war*. Duke University Press.
- Keysar, H. (2018). A spatial testimony: The politics of do-it-yourself aerial photography in East Jerusalem. *Environment and Planning D: Society and Space* 37(3), 523–541. 0263775818820326.
- Kumar, C., AbouRizk, S. M., Mohamed, Y., Taghaddos, H., & Hermann, U. (2013). *Estimation and planning tool for industrial construction scaffolding*. International Association for Automation and Robotics in Construction (IAARC).
- Murakami, H. (2008). *What a talk about when I talk about running*. Vintage.
- Murray, D. (2021). On reciprocity: Expanding the dialogue between disciplines. *Visual Studies*, 36(3), 177–186. <https://doi.org/10.1080/1472586X.2021.1969805>
- O'Hagan, L., & Serafinelli, E. (2023). Rethinking verticality through top-down views in drone hobbyist photography. *Visual Studies*. <https://doi.org/10.1080/1472586X.2023.2201239>
- Pauwels, L. (2015). *Reframing visual social science: Towards a more visual sociology and anthropology*. Cambridge University Press.
- Philippopoulos-Mihalopoulos, A. (2016). Withdrawing from atmosphere: An ontology of air partitioning and affective engineering. *Environment and Planning D: Society and Space*, 34(1), 150–167.
- Pixley, T. (2021). Reframing the homescape: Documenting domesticity during photography's COVID turn. *Visual Studies*, 36(2), 106–115.
- Rae, J. D. (2014). *Analyzing the drone debates. Targeted killing, remote warfare and military technology*. Palgrave Macmillan.
- Rancière, J. (2004). *The politics of aesthetics*. Continuum.
- Richardson, M. (2020). Drone cultures: Encounters with everyday militarisms. *Continuum*, 34(6), 858–869.
- Shanks, G. (2016). The politico-aesthetics of groundlessness and Philippe Petit's High-Wire Walk. *Performance Matters*, 2(2), 43–62.
- Urry, J., & Larsen, J. (2011). *The Tourist Gaze 3.0*. Sage Publications.
- Wall Street Journal (The). (2023). Alps Ski resorts brace for a future with less snow. Retrieved May 12, 2023, from <https://www.wsj.com/articles/alps-skiing-resorts-no-snow-season-11674836560>
- Wrigley, C. (2018). It's a bird! It's a plane! An aerial biopolitics for a multispecies sky. *Environment and Planning E: Nature and Space*, 1(4), 712–734.
- Yin, Z., & Caldas, C. (2022). Scaffolding in industrial construction projects: current practices, issues, and potential solutions. *International Journal of Construction Management*, 22(13), 2554–2563. <https://doi.org/10.1080/15623599.2020.1808562>
- Zuev, D., & Picard, D. (2015). Reconstructing the Antarctic Tourist interaction ritual chain: Visual socio-logical perspective. *Polar Journal*, 5(1), 146–169.
- Zuev, D., & Bratchford, G. (2020). The citizen drone: Protest, sousveillance and droneviewing. *Visual Studies*, 35(5), 442–456. <https://doi.org/10.1080/1472586X.2020.1843285>
- Zuev, D., & Bratchford, G. (2021). *Visual sociology: Practices and politics in contested spaces*. Palgrave Macmillan.

Part I

Experimental and Experiential Approaches to Volume and Atmospheres



Open-Weather Feminist Handbook: A Preamble

2

Sasha Engelmann and Sophie Dyer

We (open-weather) are sitting in a scout hut in Harrow, North London, studying amateur radio: the art receiving, transmitting and experimenting with the electromagnetic spectrum between 3 Hz and 3000 GHz. A boiler in the back keeps water hot for tea. A tin of biscuits has been emptied. The room is filled with twenty other people who, like us, are interested in radio. We all want to pass the upcoming exam and receive our government regulated callsigns. We want to use our newly acquired skills to transmit signals into space: waves carrying voice, text, images, or code that will travel near the speed of light, and, if the conditions are right, bounce off the ionosphere 50 kilometres above, landing in continents and oceans we have never seen.

Yet we are not ‘all in this together’, in the same way. We (open-weather) are two white, English-speaking, womxn in our thirties with no previous training in radio or wireless communication beyond secondary school. Our instructor on that day is giving a lecture about mounting a costly antenna on one’s house or car to receive images from satellites: images carried by radio waves from space to the ground. However fasci-

nating in principle, the presentation doesn’t resonate. We do not see ourselves reflected in the composition of the group gathered in the hut, the club or the wider radio amateur community. As such, the knowledge we are receiving requires an extra step of translation to be relevant to our concerns. The presenter assumes interest in advanced equipment and the cleanest possible satellite image. We are interested in noise, interference and glitch. For practical and political reasons, we want to use low-cost DIY (do-it-yourself) technologies.

Open-weather emerged three years ago from our combined effort to learn how to capture and decode NOAA (National Oceanic and Atmospheric Administration) satellite transmissions, and so images, through practices long known to amateur radio. In addition to attending lectures among radio amateurs in Scout huts, we read blog posts, deep-dived into member-only online forums and watched tutorial videos to understand how to combine off-the-shelf DIY equipment, free and open-source software. As we searched for methodologies and tools that were accessible to us, we began to realise how little was out there. This prompted us to write our own ‘DIY Satellite Ground Station’ guide and to publish it on the community science platform Public Lab in June 2020 (Open-weather, 2020). We pitched our guides towards those with no background in radio, engineering or science. We linked to free or inexpensive equipment, and tips

S. Engelmann (✉)
Royal Holloway Centre for the GeoHumanities,
Royal Holloway, University of London, London, UK
e-mail: Sasha.Engelmann@rhul.ac.uk

S. Dyer
Independent Designer and Researcher, Vienna, Austria

for further reading. We did not assume location or status, though we recognised the limits of our publishing in English. And we shared the guide ‘back’ to the amateur radio forums that had helped us along the way (Fig. 2.1).

To our surprise, our guide was replicated by around thirty people in the two months after it was published. Artists, educators and our friends began setting up their own DIY satellite ground stations in places like Buenos Aires, Seattle and Mumbai. It sparked the accidental growth of what we now call the open-weather ‘network’: a group of individuals, spread unevenly around the world and numbering over one hundred in April 2023, that submit satellite images and field notes to the open-weather archive, and sometimes collaborate in producing collective earth-images in planetary events we call ‘nowcasts’ (see Engelmann et al., 2022). Yet our guide could not have emerged without another document, key to

our abilities to think, practice and exist in the world of amateur radio: the *open-weather feminist handbook*. The handbook is a ‘living’ document containing an evolving list of intersectional feminist principles that inform our work, the decisions we make and our values. We treat these feminist principles as tools *equal to or greater in importance* to the radio antennas, cables, dongles and other technologies in a DIY satellite ground station. We do so because, as our experience in the Scout hut shows, the spaces, tools and bodies of radio and earth-imaging are far from neutral. Rather, they are embedded in, and emergent from, particular histories of technology, community and gender. These are post-war histories in which, as Anne Gessler writes, “government, commercial and cultural pressure on amateur radio to justify its existence forced the predominantly male hobby to police its borders against female incursions” (Gessler, 2017: 279). Indeed,



Fig. 2.1 DIY satellite ground station workshop by open-weather on the occasion of the Weather Engines exhibition curated by Daphne Dragona and Jussi Parikka at Onassis Stegi, Athens, May 2022. (Photography by Dimitris Michalakis)

our ‘intersectional feminist ethos’ was, for certain members of a popular amateur radio forum, an incursion on the ‘purity’ of the hobby. In the comments section of a post about our newly published how-to guide, one commenter claimed that we made them physically sick, and another compared our work to a foul smell. We noted these metaphors of bodily invasion and disgust, alongside the sexualised language often applied to female presenting voices on amateur radio frequencies (Engelmann, 2021). Apparently, following Sarah Ahmed (2017), our feminism made us ‘killjoys’ in amateur radio. Members of the forum advised us to ‘stay out’.

The open-weather feminist handbook is a response to these comments and histories, but it is also an attempt to trace alternative genealogies of radio. One of our feminist principles ‘We learn from alternative histories of sensing and séance’ draws from our research into 19th clairvoyant practices and the wireless imagination. Clairvoyant people in nineteenth-century Britain were most often illiterate female ‘mediums’ whose ‘uneducated’ and ‘naïve’ nature purportedly gave them more access to invisible magnetic and communicative forces (Hoffman, 2014). It was also believed that they would be less able to fake contact or source information (unable to read newspaper articles with information about the missing). Yet, as Hoffman (2014) shows, mediums were hardly naïve or powerless; they played active roles in discourses on nationhood, transformed practices of spirit photography and influenced the writing of the Spiritualist industry. They also used inventive devices made of everyday household objects, from ‘spirit slates’ to ‘spirit trumpets’ to the vomiting of the ‘ectoplasm’, to make the invisible world palpable (Gallerneaux, 2021). The celebrated medium Emma L. of Bolton was commissioned to locate the long-lost Arctic expedition of Sir John Franklin; during a séance, she used her fingers to trace the possible route of the expedition on a map (Stephens & McCorristine, 2014: np). Given these performances in seeing and sensing, it is unsurprising that the clairvoyant women of Britain were compared to the telegraph network (Stephens & McCorristine, 2014: np). For geog-

rapher Shane McCorristine, Bolton and her fellow practitioners were a ‘community of sensation’ crafting the electromagnetic imaginary of their time (Stephens & McCorristine, 2014: np). Though this community is rarely cited in histories of radio or telecommunications, their experiments were key in producing the imaginative conditions that oft-cited inventors like Guglielmo Marconi grasped and instrumentalised for science. Thus, in open-weather, when we raise our antennas and hear a burst of sound in a sea of static, we are participating in a séance. We are listening to, and meeting with, the bodies of womxn who ‘heard’ a signal in the noise.

A feminist history of radio is a history of the body. Radio feminists in 1980s London would run up to the roofs of tower blocks and hold their DIY antennas to the sky while broadcasting to the neighbourhood. Their portable, modular equipment allowed them to pack up and disappear into the city should the police arrive. Radio Pirate Woman, a group active in Galway, Ireland, in the late 1980s and 1990s, often met in kitchens and living rooms over tea. The group was formed by writer and activist Margaretta d’Arcy as a platform for discussion on womxns’ reproductive rights at a time when bodily autonomy and abortion were illegal subjects on national radio (d’Arcy, 2020). During the production of the first open-weather performance in the midst of the first Covid-19 lockdown in London, we discovered that our radio reception shifted when we stood barefoot on our metal balconies. We speculated on the relationships between our breathing bodies, the bodies of the satellites orbiting overhead, and the bodies of weather and atmosphere unfolding in between. We read *The Second Body* (2017) by Daisy Hildyard and traced the extensions of our bodies into the pixels of satellite images. We felt how, “at some microscopic level or intangible scale” our bodies, “break into one another” (Hildyard, 2017: 25). Instead of affirming the power of technology to reach beyond the capacity of the body, centring our bodies gave us more room to feel, think and experiment. Like countless feminist practitioners who envision chimerical, cyborgian and queer technological hybrids, we propose that ‘our bodies count’.

The body has figured prominently in feminist critiques of satellite images and earth observation; the view from the body is often an antidote to ideas of ‘infinite vision’ and ‘god trick’ perspectives (Haraway, 1988: 582). Yet our experiences in open-weather invite us to move beyond the dualities of body/satellite, near/remote and micro/macro that often frame engagements with these arguments, as well as grassroots interventions into environmental sensing infrastructures. Instead, in line with decades of work by feminist geographers, we consider technologies like satellites as potentially subversive prostheses. Understood as a prosthetic rather than a universal symbol of ‘big science’ or the masculinist gaze, a satellite becomes an extension of the body, or a way of inscribing the body into a set of earth media, thus complicating static notions of scale and agency. Other technologies including software, cables and radio antennas similarly become instruments for introducing local context or imaginative propositions into planetary images.

As a set of orientations for imaging the earth otherwise, the *open-weather feminist handbook* attends not only to the work of collecting satellite images through DIY amateur radio tools, but also to the management, organisation and processing of materials. One of our key principles—‘open-weather is data feminist’—challenges us to adhere to the eight tenets of data feminism as proposed by Catherine d’Ignazio and Lauren Klein (2020). Our engagement with data feminism involves thinking critically and carefully about what kinds of data we are collecting, storing and publishing from the diverse practitioners who submit to the *open-weather* archive; what power relations are hidden in this data collection process; which binaries and hierarchies are often inadvertently re-created; and how these binaries can be troubled. Taking cues from d’Ignazio and Klein (2020), as well as projects like the Cyberfeminism Index (Seu, 2021), we are constructing the open-weather archive and web platform so that imaginative, speculative and critical

uses of weather data are promoted over utilitarian and deterministic uses. Thus, in *open-weather* we “insist on the possible over the probable” (Engelmann & Dyer, 2023: np). In our presentations and writings, we use fiction to narrate the present, and explore the present as its own fiction. Following a long lineage of feminist science fiction writers from Ursula LeGuin to Octavia Butler, we are invested in ‘speculative gestures’ that prefigure alternative worlds. We resonate with facilitator, doula and writer adrienne marie brown when they say that, “all organising is science fiction” because it requires us to envision and create a world that does not yet exist (Brown, 2022: 288).

The feminist handbook is an index of sources that sustain open-weather: where ‘open-weather’ refers to a planetary experiment in imaging and imagining the earth and its weather systems using DIY community tools, as well as our collaborative practice. Our handbook is full of references because “Citation is feminist memory” (Ahmed, 2017: 15). Though we cite widely, from the poetry of Claudia Rankine to the intersectional feminist anthology *This Bridge Called My Back* to the queer theory of Judith Butler to the toolkits of the Design Justice Network, we are careful to show how feminist ideas inform our practice in concrete and meaningful ways. Inspired greatly by the Lab Book of the Civic Laboratory for Environmental Action Research (CLEAR, 2021) we explore how feminist ideas orient the everyday and personal spheres of our work, indeed our ‘homework’ (Ahmed, 2017) from the pace of decision-making to importance of our friendship.

When you read the handbook, we invite you to consider each principle as an offering: a tool, a gift, a gesture. We invite you to read the handbook as a ‘feminist vision’: the manifesto of a radical experiment in world-building (Olufemi, 2020). We invite you to approach the handbook as a collection of frequencies, a mixtape of sorts, for a long, onward journey (Fig. 2.2).

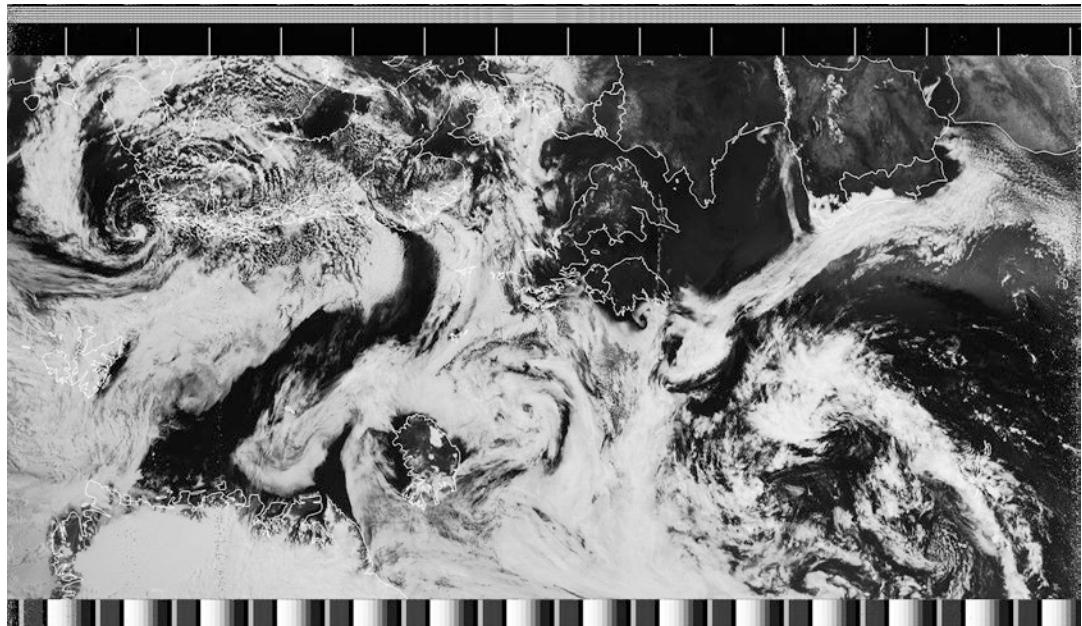


Fig. 2.2 NOAA-19, Isle of Mull, 20 July 2021, 12:18 GMT. (Open-weather CC BY 4.0)

References

- Ahmed, S. (2017). *Living a feminist life*. Duke University Press.
- Brown, AM. (2022). *Pleasure activism: The Politics of Feeling Good*. Chico, California: AK Press.
- CLEAR. (2021). *CLEAR Lab Book: A living manual of our values, guidelines, and protocols, V.03*. Civic Laboratory for Environmental Action Research, Memorial University of Newfoundland and Labrador.
- D'Arcy, M. (2020). Interview: Margareta D'Arcy (Women's Scéal Radio/Radio Pirate Woman). <https://pirate.ie/archive/tags/margareta-darcy/>
- D'ignazio, C., & Klein, L. F. (2020). *Data feminism*. MIT Press.
- Engelmann, S. (2021). Planetary radio. *The Contemporary Journal*. <https://thecontemporaryjournal.org/strands/sonic-continuum/planetary-radio>
- Engelmann, S., & Dyer, S. (2023). Open-weather feminist handbook. https://docs.google.com/document/d/1ogBnWkj1PdjtwRRI4ms_m51rus8t0H7K6wMP_h4SGdQ/edit#
- Engelmann, S., Dyer, S., Malcolm, L., & Powers, D. (2022). Open-weather: Speculative-feminist proposi-
- tions for planetary images in an era of climate crisis. *Geoforum*, 137, 237–247.
- Gallerneaux, K. (2021). *High static, dead lines: Sonic spectres & the object hereafter*. MIT Press.
- Gessler, A. (2017). Dust mop or mic?: Women's utopian border crossings in Cold War ham radio. *Radio Journal: International Studies in Broadcast & Audio Media*, 15(2), 279–298.
- Haraway, D. (1988). Situated knowledges: The science question in feminism and the privilege of partial perspective. *Feminist Studies*, 14(3), 575–599. <https://doi.org/10.2307/3178066>
- Hildyard, D. (2017). *The second body*. Fitzcarraldo.
- Hoffman, G. K. (2014). *Otherworldly impressions: Female mediumship in Britain and America in the nineteenth and early twentieth centuries*. PhD Dissertation, University of California, Riverside.
- Olufemi, L. (2020). *Feminism, interrupted: Disrupting power*. Pluto Press.
- Open-Weather. (2020). DIY Satellite Ground Station. Public Lab. <https://publiclab.org/notes/sashae/06-26-2020/diy-satellite-ground-station>
- Seu, M. (2021). Cyperfeminism index. <http://cyberfeminismindex.com>
- Stephens, C., & McCorristine, S. (2014). The magnetic north. *The New Inquiry*. <https://thenewinquiry.com/the-magnetic-north/>



Of Carnal Gravity: A Three-Voice Conversation

3

Julie Patarin-Jossec, Jean-François Clervoy,
and Jeanne Morel

Jean-François Clervoy is a European Space Agency/NASA astronaut and founder of a parabolic flight programme in France (Novespace-AirZeroG), who had the opportunity to visualise the Earth from outer space; Jeanne Morel is an interdisciplinary artist who dances in extreme environments and creates immersive artworks with the new media artist Paul Marlier; Julie Patarin-Jossec is a sociologist by education, a photographer, and professional diver who occasionally flies. Neither Jean-François, Jeanne nor Julie's experiences can be defined by a single activity, and through their work and explorations around and above the world, they all had different, if not radical, experiences of verticality from outer space to oceans depths—and everything in between. Intertwining art practice, air and spaceflight training, and underwater sensations, their conversation is a three-voice meditation over the sensible and aesthetical ways to apprehend verticality/ies. The verticalities experienced (and experimented with) as unveiled in this interview piece are inextricably connected to gravity and weightiness. Not only an order imposed to living things by nature, not exactly an inevitable condition, but often source of inspiration and carnal liberation, these verticalities reveal embodiment processes and a relation to senses, movement and technologies, where leaving the terrestrial ground can lead to retrain bodies

and mentalities. The three contributors met to record this conversation at the headquarters of the Centre National d'Etudes Spatiales, in Paris, France. The transcript has been edited for clarity and length.

Julie: I started my career as a scholar in sociology. My research emphasised the astronaut training for the International Space Station, which fieldwork led me to experience a parabolic flight with Novespace to better understand the flight experience and sensations of astronauts in weightlessness. Through teaching and publications, I then tried to circulate how I had analysed these, including using visual methodologies. I've always been irrationally attracted to filmmaking and photography, especially to how Nouvelle Vague, "art et essai" and experimental filmmakers were creating visual languages. I devoured thousands of visuals of all kinds for years before I found a vector in these media to express my work. However, I also always felt a discomfort regarding the intellectual traditions wherein my visual experiments were grounded, such as French anthropological documentary filmmaking as developed in the 1950s and framed by a certain definition of legitimate knowledge. And a few years later, who knows why (I'm not sure I do), I once put a breathing regulator in my mouth and started exploring underwater worlds. I never stopped diving since the very day I tried this activity, and that

J. Patarin-Jossec (✉)
Royal Society of Arts, London, UK

J.-F. Clervoy
CNES, Paris, France

J. Morel
Art in Space, Paris, France

deeply changed the way I apprehend the astronaut training, which includes underwater training for spacewalks. As a private aircraft and acrobatic flight pilot, it has also been fascinating for me to reflect on experiencing environments where most people don't go, while moving from air to underwater—and back again.

Jeanne: My name is Jeanne Morel, I'm a pluri-disciplinary artist and researcher. I work in duet with the architect and new media artist Paul Marlier. I am part of UNESCO's Conseil International de la Danse, and I dance in extreme or wild environments: in high altitude, underwater, on volcanos... I was lucky to dance several times in weightlessness, thanks to Jean-François, who supports our work—my partner and associate Paul Marlier, and I. Together, we look for the essence of movement, perhaps the essence of life itself: what remains, what print remains when we dance. For me, dance is far from being a codified ballet that we should all repeat. It is rather a very strong, transcending emotion, and we create art works based on biometric data that Paul captures throughout my body when I dance. These biometric data generate immersive art pieces, paintings, sculptures, as well as a 360 degrees film we're currently working on. In the meantime, I studied literature and art history, and I'm pursuing research in philosophy, and those knowledges are fundamental in my research. The mind and body are connected, horizontally or vertically: a dancer can think, and a thinker can dance.

Jean-François: My background is not as fun, maybe because I am from a previous generation. My father was a fighter pilot, so what defines my childhood is moving every two or three years. I never built strong friendship with my classmates, unlike my own children. And all my life, I had this connection with air, starting with my father who used to take my brother and I to acrobatic flight and parachutist air shows. I would define myself as somebody who has a very rational intellect, while I have always been attracted by the sky and used to travel. I later never experienced the

need to go to look elsewhere, because I already knew a lot of elsewhere, including Lebanon and the Middle East where, as a teenager, I got to trek in their natural wonders, mountains, deserts, and practice freediving or snorkelling in the Mediterranean and the Red seas.

Jeanne: So, you were a nomad since you were a child.

Jean-François: Yes, but without being aware of this. These life experiences allowed me to feel comfortable anywhere in the world throughout my life: I can adapt to wherever I go without fears or discomforts. However, I am very rationale and I've always been, which led me to study engineering despite the fact I'm not particularly a mathlete. I've always been very attentive and curious about all the things I don't know. So, I did Math Sup [Superior Mathematics] and Math Spé [Special Mathematics] before choosing the Ecole Polytechnique because it was a way to postpone the moment where I had to choose an actual profession. And at Polytechnic, I had a blast: I followed classes by the most proficient teachers in fields that I wouldn't have expected to learn or understand, like quantum mechanics. I was lucky to receive a very high-level academic training in natural sciences (which was the equivalent of a master's degree in mathematics, physics, and chemistry). I was increasingly interested in space, certainly influenced by the Apollo program and by the *Star Trek* TV series, and the fascinating idea of teleportation: being able to mentally travel somewhere without having to do the effort of actually going there with your feet or a transportation vehicle. When I was a teenager, I wanted to be an architect or physician, but while practicing as an aeromodeller, i.e., remotely projecting myself on the model airplane I was piloting, which is a form of teleportation, this grounded me in the aerial environment. I then became fascinated by the capability of remotely piloting interplanetary probes. This is how I started.

Julie: And this is what is specific to your career as an astronaut: the fact that you became spe-

cialized in teleoperating robotic arms and to have this ability to remotely operate....

Jean-François: ...machines, exactly. I have a typical student education in engineering, inspired and fascinated by space, and since I somehow always had a natural taste for adventure, I passed all my parachutist qualifications, did some underwater diving, became private pilot... to the point it was natural to be attracted by space and apply the day France launched an astronaut selection. I am a child of the space conquest: I was born with this, so it was normal for me to try to become an astronaut because people, including my teachers, were regularly talking about the Apollo flights. I also did some climbing, although sometimes, I feared about looking down (Fig. 3.1).

Julie: And you have never felt frightened while looking down on the Earth during your flights?

Jean-François: Never! I don't have vertigo, and on the contrary, I am attracted to the void. [Jeanne and Julie acquiesce.] I always had this attraction, the desire to jump in the void hoping to be saved before hitting the ground, to the point I feel tingling on the soles of my feet.



Fig. 3.1 Portrait of Jean-François Clervoy wearing fighter jet helmet, by Julie Patarin-Jossec, photographed at CNES headquarters in Paris. 2020. Credits: Julie Patarin-Jossec

For me, verticality is a third dimension pointing downwards, and related to the force of gravity and this attraction to the void, from which I was dreaming getting free (Fig. 3.2).

Jeanne: My father and godfather were alpinists, and my godfather showed me the sky and the stars. He had studied astrophysics, and this is something that deeply mattered for me in my childhood. Never would I have thought I would work in the space field, create a company called "Art in Space", and connect space with digital art, dance and ballet. For me, everything is dance: we're currently dancing because we spin on ourselves, we rotate around the sun, we are in permanent movement. It's funny to realise how childhood leads us to find a meaning in our professions. When I was watching the stars, when my father and godfather were climbing, and when I read a magazine my parents had, titled *Vertical*¹, it was impressive to see how these individuals managed to elevate themselves with so many efforts and difficulty.

Julie: Besides the locations where you dance, how is this connection to the sky and stars an inspiration in your work and your relationship to movements?

Jeanne: I am not interested in the notion of traditionally choreographed dancing such as ballet: I find this beautiful but doing it myself doesn't interest me much. In choreography, there is a kind of narcissistic reproduction of movement, where everyone repeats in front of a glass, often in vertical positions, and while constantly looking at themselves. Of course, we can find our own language in this reproduction, but it is limited. Besides, what connection can we find with the environment we're in when we reproduce? What interests me in dancing is trance, or how, in a particular location, I will find movements that will connect me with where I am during the process. I strongly felt this relationship with stars when I danced in the mountains, because stars are very present there. At sea as well, while dancing on a boat, but I prefer less crowded places.

¹<https://www.vertical-magazine.com>.



Fig. 3.2 Jean-François Clervoy, Scott Parazynski, and mascot “Hog” from the STS-66 crew, “living upside down” aboard the Atlantis Space Shuttle. 1994. Credits: NASA

And at some point, I connect myself to the mountain where I am located, but also, obviously, to all these stars that rotate around me... (Fig. 3.3)

Julie: Like a feeling of osmosis?

Jeanne: Yes, and this is also my refuge. I've always used dancing as a language and a refuge—since I was little. The feeling of belonging to this world, this ballet. One cannot fear dying when feeling part of this ballet.

Jean-François: But do you feel reassured also because you feel you perfectly control the slightest muscle and segment of your body?

Jeanne: Yes, I dismiss the ballet-dancing I mentioned, but of course, I studied this dance, classical technique, and so on. And technique is *useful*, we can use it [Julie acquiesces] but if I had to do only this, I would be profoundly sad. Just saying to myself: “Ah, I did this turn very well, I succeeded doing this jump well”, this doesn't bring me joy. However, knowing that my body is ready is important.

Julie: Control and know-how also matter a lot in diving: your very survival depends on how you handle your buoyancy and your life support equipment. Although I think you, Jean-François, are the only one of us who had an in-situ visual solicitation of your vertical experience from the Low Earth Orbit, looking down at the Earth.

Jean-François: True! In my first flight, we were almost all the time flying inverted [the Space Shuttle upside down]. Both overhead windows located on the ceiling, which are the biggest on the Shuttle, were pointing towards the Earth. This shuttle orientation was necessary for the pointing of our instruments studying the atmosphere. Then, in order to look at the Earth, we got “down” on our knees on those ceiling windows, and we watched the Earth pass by. When we were on our knees, with the Earth below, we then had the feeling that we were still upright along the local verticality. However, when I was



Fig. 3.3 Jeanne during her first 0G flight with Novespace, following her selection by the French Space Agency CNES to conduct a creation project in weightlessness. The motion capture of her dance generated hers and Paul's first artwork in real time. 2016. (Credits: Paul Marlier)

piloting the robotic arm, with the Shuttle still upside down, I was upright in the Shuttle, and the Earth was above me. I remember the first time I presented this at a conference hosted by Michel Serres [a French philosopher and historian of sciences], I showed on a photo slide a picture with the Earth above me, and said “so, we were looking at the Earth from below”. This deeply upset Michel Serres: never had he imagined that an Earthling could say one day “I was looking up at the Earth from below”. In any case, for me, as an engineer and astronaut, verticality is completely defined by gravity, or rather *weightiness*. When there is no weightiness felt anymore, everything becomes possible: you can choose to live without or to keep verticality, including using virtual reality. You might not feel the force of gravity, but you know it is still there, because as an engineer you know it is there, you just don’t feel it because you’re in free fall with nothing to

stop the fall, as opposed to being on Earth. Or you can decide that, because you don’t feel this force of gravity, you can live without verticality. Therefore I tried to do everything I could aboard the Shuttle that weightiness would not allow me to do on Earth: sleeping on the ceiling, eating upside down ... While some of my crewmates continued to live in the same orientation as on Earth (Fig. 3.4).

Jeanne: Because of habits [Julie acquiesces].

Jean-François: Still today, using spacecrafts requires training, which in its turn requires simulators, which are on Earth, and on Earth, there’s weightiness. In a simulator, there is a clear up and down, the screens are positioned as in an aircraft cockpit, with the “on” interrupter position at the top and the “off” interrupter position below... All indicators and instruments, including for temperature, are vertically oriented, because we’re used to have smaller numbers at the bottom of the scale and higher numbers at the top of the

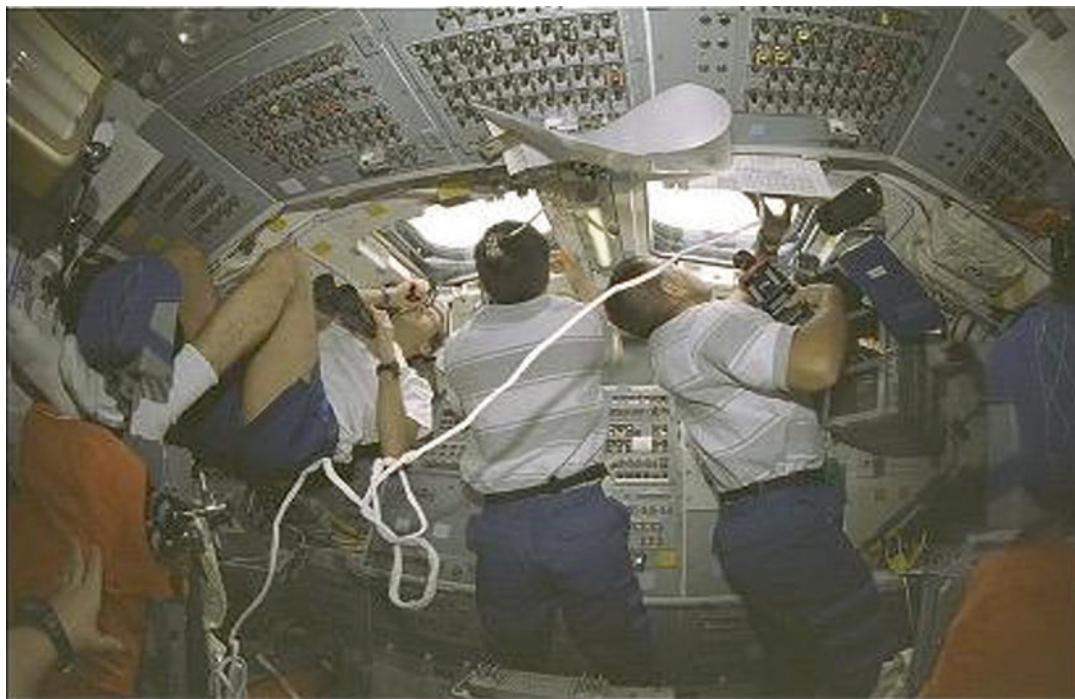


Fig. 3.4 The STS-84 crew looking up to the Earth from the Atlantis Space Shuttle. 1997. Credits: NASA

scale. Older aircrafts have circular indicators for speed and altitude, because it's mechanically simpler to manufacture these that way, but as soon as we started using screens, they all displayed flight data on vertical scales, like temperature thermometers. Every user has incorporated the idea that indicators are displayed vertically with lower values at the bottom and higher values at the top. Furthermore, verticality is mathematically a straight line oriented upwards, and I naturally tend to provide this verticality with a direction considering that in vectorial mathematics, the straight line's direction is an orientation towards a certain point: there is a departure and an arrival point. The top of this verticality is the skies, while its bottom is the centre of the earth, which we can't reach because obstacles prevent us from falling there. Weightiness makes it hard to climb on this verticality. Verticality is weightiness with a privileged orientation, which explains why climbing is extremely hard while going down is extremely easy.

Julie: Speaking of this relationship of verticality and weightiness, there are for me two experiences, radically different if not opposed: acrobatic flying and underwater diving. Acrobatic flying is exactly what you just explained, Jean-François: you are inextricably dependent on the force of gravity. In some acrobatic figures like spinning, you ascend, then stop the engine, which inevitably leads the aircraft to fall. The way you pilot the aircraft requires considering how your aircraft reacts to this surrounding environment framed by weightiness.

Jean-François: And this mental vision of verticality changes when the feeling of weightiness changes.

Julie: Exactly. Underwater is the opposite of acrobatic flying since in water, you are almost in weightlessness. Your body experiences the environment in a completely different way: if you want to stay for a while with your feet towards the surface and your head downwards, you can, as long as you have the proper equip-

ment—some regulators do not function well in this inverted orientation and would let water get in. What I love in water is also how you can sometimes dive without visibility, which means that you cannot see what surrounds you and visually check whether you go down or up. However, like g-forces in an airplane, your eustachian tube and the need to equilibrate your eardrum tells you underwater if you ascend or descend, because the different pressures inside and outside your ear create sensations, and eventually a pain. This means you literally *feel* your verticality in water even if you're in complete darkness. That might be a set of sensations you also get in dancing. [Jeanne acquiesces.] But these are sensations you need to develop, to learn how and when to identify them, and what you must do based on these signals to avoid injuries.

Jeanne: It is funny, because for me, verticality is fundamentally related to horizontality. In my work, even when I was studying at the Conservatoire, I always enjoyed what we call “the ground”, which is a term we use for movements on, or close to, the ground. These movements always connected me more to an animal condition. Verticality was for me related to humans, to what we aim to be or play in our everyday life while standing up, considering we are the animal species that became biped. In contrast, horizontality connected me to dreams, to when we lie down, closer to touching and to the ground, hence closer to animalistic sensations. Horizontality is also more connected for me to pleasure, like during intimate relationships, or during transcendental meditations. For me, weightiness is extremely present while in horizontal positions: I can take refuge in this weightiness, cuddle up in it...

Jean-François: We can feel it throughout the entire body. We sleep easier lying down than standing up!

Jeanne: Exactly, weightiness is more present horizontally, because there is more surface on which it can be experienced. I questioned myself a lot about this in my work: we always tend to elevate ourselves, to climb and jump

higher, while working closer to the ground is very interesting.

Jean-François: To follow-up on this, it's true that verticality is conceptually opposed to horizontality. Moving along to a third dimension, freed from the horizontal axis, is really hard due to weightiness on Earth. This is obviously not the case in weightlessness either in space or underwater, where it is very easy to move vertically.

Jeanne: Aboard the International Space Station, is the crew moving horizontally?

Julie: Yes, but not only.

Jean-François: All dimensions become equal, in weightlessness. On Earth, it's easy to bike horizontally, but it's hard to climb a cliff. Verticality is a forced direction for Earthlings with this difficulty to travel along verticality, except, as mentioned earlier, for those who can free themselves from this imposed direction in diving or in a spaceflight. However, one can do marvellous things if ready to mentally play with verticality. For instance, imagine being underwater, head over heels, and putting some air in your buoyancy control vest: the addition of air volume would drag you up, but because you are upside down, you would “fall” towards the surface, which means towards the light since, in that case, the sun shines below you. Let's note that it's extremely rare to be in such a situation where lights are below your feet, and not above your head.

Jeanne: According to Freud, language is why humans stand as opposed to animals, but in medicine, if humans can stand, it's only due to a small cavity in the bottom part of our back, while, in fact, we're always unstable.

Jean-François: Right. For the paleoanthropologist Yves Coppens, compared to our quadruped ancestors, we have not yet finished our evolution towards verticality.

Jeanne: I love the idea that we're always a little bit flickering, in this verticality. Our verticality is not stable, we don't elevate ourselves in some magistral gesture: it's rather something we always need to handle, to watch our imbalance. Like in physics, what doesn't move is dead, and what is in disequilibrium is alive. I

like the idea that we're in an imperfect verticality.

Jean-François: When we walk, we're in constant controlled imbalance.

Julie: While in water and space, the most natural body position, the one you can find balance with, is perfect horizontality. When one starts diving, there is a tendency to try to stand up, because our bodies are so disciplined and trained to standing up that bodies have acquired and assimilated certain positions as being "normal".

Jean-François: You're right, when you're underwater, horizontality is the most efficient way to move since you use fins, while on Earth, you must move a leg in front of another standing up, in a very well controlled manner, in order to get a stable walk.

Jeanne: And you see, in the parabolic flight airplane, initially it's like if my body instinctively tries to keep a vertical position. However, I'm precisely interested in letting myself being "embedded" by this environment.

Jean-François: I always sit on the ceiling during parabolas. I always do whatever is impossible under Earth's weightiness, because weightlessness is the only condition where I'm able to do these things, like sitting on the ceiling. It's like, underwater, expiring all the air you have in your lungs and sit or lay down on the floor, at the bottom of a swimming pool for instance, where a very light push suffices to make you effortlessly levitate. Doing this, you can completely forget the very notion of verticality, and visuality dominates.

Jeanne: What I also like in diving is to look at the surface.

Jean-François: Imagine you're so deep underwater that you cannot see the surface, but you can only see your bubbles on a few meters around you. Laying down at the bottom, seeing your bubbles flowing in front of you until two or three meters, and then nothing. You wouldn't really have a notion of verticality considering that your bubbles would move horizontally relatively to your body.

Julie: The only way you can then notice the orientation of your body is the direction of your bubbles because those always go up vertically towards the surface.

Jean-François: So, you mentioned feeling your eardrum, now you refer to your sense of sight with using the direction of air bubbles...

Julie: Although for me, the sense of touch has always been very important underwater, at least to *work* underwater. Touch is primordial because I happened to work in very low visibility conditions, to the point I couldn't see anything around me. For instance, I often couldn't see my hands the few times I had an opportunity to weld underwater, as part of my commercial diving activities. Sight is not always the more reliable sense in extreme environments. In these circumstances, you need to develop other ways to feel (rather than seeing) what surrounds you and to be extremely attentive to what happens in your close environment, without vision (Fig. 3.5).



Fig. 3.5 Julie Patarin-Jossec wearing surface-supplied air equipment for underwater welding training, Fréjus. 2022. Credits: Théo Bothorel

Jean-François: We could say that on Earth, verticality is endured because of weightiness, but as soon as we can free ourselves from this weightiness, underwater or in space, verticality becomes a direction we can play with [Jeanne and Julie acquiesce]. And on Earth, touch dominates because at any time you can feel your body pressing against the ground or a surface under the effect of weightiness.

Jeanne: Sight as well, because vertigo is the feeling to be up, or at least up above our feet.

Julie: Either underwater or with terrestrial vertigo, the inner ear and vestibular system dominate since they generate (dis)orientation. Speaking of sight, the Ohio State University works on astronaut training and analogues considering various disabilities, including blindness². Their approach to piloting an aircraft or reacting to weightlessness in parabolic flights is brilliant, because their pilots' relationship to the interface of cockpits and to risk management relies on drastically different body experiences and trainings—without, or *beyond*, vision.

Jean-François: This reminds me of a test during the astronaut training. We had to wear thick glass goggles to not being able to visually focus on a point in the room, and the medical team injected either very cold or hot water in one ear, and nothing in the other, to generate a vestibular dissymmetry. We hated this test because it was very painful. This dissymmetry triggers a rapid repetitive eye motion to the side and back. It is called nystagmus, a rhythmical, repetitive and involuntary movement of the eyes either vertically or horizontally. They explained to me that when you turn your head, what allows you to have a stable image of your environment is not a simple mechanical holding of your eyeballs in their orbits, but a faster brain-controlled piloting loop based on information forwarded by the inner ear. The inner ear works via the brain, connecting the entire vision system to movements. If you cut the liaison of the inner ear to the brain, not only

will your eyes will provide an unstable image, but you will have the feeling that, when turning your head, the world moves around you, rather than perceiving that you move in your environment when you turn your head. We don't learn about the inner ear at school along with other senses because it's an invisible sense, although it's fundamental.

Jeanne: The inner ear is a fundamental sense in dancing as well, to turn, do somersaults, to jump... In weightlessness, I've never been sick, but people always say that we shouldn't move our eyes in 2 g [during the acceleration phasis preceding weightlessness], because this might lead us to throw-up. Why?

Jean-François: This is a neurosensorial conflict experienced by the brain, which receives incoherent information from the eyes and from the inner ear. The inner ear tells you that you're in an accelerated motion, while what you see around you doesn't move.

Jeanne: It's more related to vision than the inner ear, then.

Julie: It's actually the articulation of both.

Jean-François: Right, sight and the inner ear are two captors, two senses, with a dependency. Vision needs the inner ear, but not the other way around. A blind person can walk, sense their vertical direction and stand up thanks to the inner ear, but you can't see well and stand-up easily without the inner ear. Visual performance is only related to the eye, but if you want to use this visual information to orient yourself in your environment, you cannot dissociate sight from the inner ear.

Julie: There are two different things here: senses that frames the experiences we live, and senses we call to transmit these experiences to others. We can rely on touch during an activity but use a visual medium to convey a sense of what we've experienced during that activity to others.

Jeanne: This is what my partner, Paul, does in our work. Usually, you sit in an opera and watch a ballet or dance representation, looking towards the stage. Paul translates dance through other senses, including in developing immersive representations. Sight is, of course,

²<https://astroaccess.org>.

important, as well as sounds and how music translates emotions, but immersive experiences can also relate on the inner ear, while the spectator's seat rotates to allow people to live again the moment of the movement's creation.

Julie: And you, Jean-François, use photographs of work and life aboard the Space Shuttle to express the sensations that your body experienced in weightlessness. I do the same with diving.

Jean-François: Indeed, during our photo and video training, instructors insist that images are the only way to describe our life in space and consequently, we should give great attention to the way we capture them, technically and artistically. There is a picture I often show with Ed Lu and Carlos Noriega, who were on their first spaceflight [expedition "STS-84" aboard Shuttle Atlantis, 1997], while we were resupplying the Mir space station. They were both positioned exactly as during their simulator training, with their feet attached on the cockpit floor, while I had my feet secured in the pilot's headrest, facing the ceiling.

Jeanne: This is what exploring is. Either we reproduce what we know, or as I try to do with dance, we leave our comfort zone to better experience the environment we're in. Living weightlessness is to let ourselves being affected by it.

Julie: This experience of the environment we're in is also deeply framed by the interface we use or how the artificial environment around us has been designed and built. The very design of the interior modules of a space vehicle influences the way bodies can position themselves in these environments. We tend to reproduce objects and spaces which are meaningful on Earth and in weightlessness conditions, although there are obsolete in weightlessness—like in the way we sleep, eat, clean, dwell, etc. These are culturally grounded, and the resulting design strongly influences the margins of freedom and creativity that astronauts can develop.

Jeanne: Architecture itself does this on Earth: it can either limit or increase freedom of individuals.

Julie: You're right: according to the philosopher of architecture Ludger Schwarte, the French Revolution wouldn't have happened if we hadn't built large public spaces allowing crowd mobilisations. It's pretty much the same in outer space: artificial spaces built to support the crews' survival deeply inform their experience of outer space, either in an empowering or limited manner.

Jeanne: Jean-François, you once showed us a documentary about the astronaut Story Musgrave, where he explains how "disincarnation elevates [his] consciousness". This is what verticality does to my body: disincarnating through meditation or transcendental experiences elevates us. Even in parabolic flights, there is this moment when you think "now, I'm abandoning myself to weightlessness". I was adding dancing because dance is my way to enter in trance, but cumulated with this oversensing effect of weightlessness, you experience something marvellous that profoundly affects your life.

Jean-François: And regarding verticality, it struck me that, to leave the Earth, we need to leave vertically and as fast as possible to free ourselves from the atmospheric drag and become solely subject to the pure force of gravity, in perpetual free-fall. All rocket launches leave vertically and after two minutes, incline the spacecraft trajectory to reach cruising orbital speed, horizontally.

Jeanne: Would verticality be a synonym of effort, then? Climbing a mountain requires a great effort, just as to make a rocket fly.

Jean-François: Verticality is the direction of the fight against the constraints we had before trying to free ourselves from this condition. But for me, since I received a natural science education, verticality is first and foremost a mathematical concept, materialised by the plumb line.

Julie: Which only have a meaning under weightiness.

Jean-François: Yes, weightiness is the effect of sensing weight generated by the fact that there are obstacles stopping us from free-falling under the effect of gravity. Falling is due to gravity, feeling weight is due to the

opposite force preventing us from falling. If there were no floors nor ground under our feet, we would be in constant free fall, and unaware that gravity exists. This is what Albert Einstein referred to as the “happiest thought” of his life.

Jeanne: At the same time as it is a constraint, verticality reassures us.

Jean-François: Verticality can be visualised, endured, rationally defined, and played with. Earlier in our conversation, you asked me about vertigo in space when we look down at the Earth. Actually, vertigo happens when you sense a physical disturbance looking downwards, while there's something to prevent you from falling. If you walk on a transparent glass bridge, you can see what stands far below. Since you feel a surface pressing against the soles of your feet, you are pulled downwards but the glass prevents you to fall. This visual solicitation combined with the feeling of being pulled downwards generate a fear of falling, and ultimately, vertigo. In weightlessness, when you look at the Earth from outer space, you don't feel any pulling towards the Earth [due to the lack of weightlessness], so the Earth becomes an object among others in your landscape. No force is exercised to give you the feeling you're getting closer or farther from this object. This is why the notion of verticality disappears in weightlessness. Either in a spaceflight or in diving, it's fantastic to find yourself able to get free from this constraint of verticality and weightiness.

Jeanne: I worked in a circus when I was younger, the Cirque Plume, and what I preferred was the moment *after* the constraint. I was a trapezist, and I loved lying down under my trapeze in the marquee, to look at the trapeze continuing to fly. I had experienced verticality during the show, and afterwards, I could lie horizontally and watch it continuing its movement.

Julie: This is close to the sensations we experience in acrobatic flight, where you're constantly reminded about the ground on which you could crash the aircraft if you fail. You also strongly feel weightiness depending on the phases of the figure you're realising—

either being glued to your seat under 2 or 3 g when ascending, or lifting from your pilot's seat while falling in a controlled way. You feel this pulling towards the ground in each of your moves, and often in an increased density. You're also influenced and restrained by the cockpit ergonomics, depending on how much room you have around you, the seat belt position and tightness, and so on. Underwater, I've experienced vertigo while floating above a 100-metres void, the kind of depth where you cannot see more than the first few metres. I felt attracted to this kind of emptiness, because it becomes a visionless void, which attraction relies on this very lack of visibility.

Jean-François: So, this feeling is related to vision. Your experience reminds me looking at the cosmos while in space. You see nothing else than an empty black darkness to infinity and can easily accept the idea that we are in the middle of nowhere, alone in an infinite universe. But if you switch off all the lights in the cockpit, while on the night side of the orbit to kill all light source around, after a while, you can see so many colourful stars that you can't help thinking we are not alone. Note that the cosmic void is different from the void without objects or without gases—like in vacuum chambers we use for training, because in the latter case, the void has visible limits: the walls.

Jeanne: Speaking of which, if we were left in a void of objects without constraints, either natural like underwater or artificial, what would we do? Would we stay, motionless, or would we explore this void anyway?

Julie: Maybe we would explore the void without having to move, maybe without noticing whether we're moving. This is one of the reasons I love cave diving: most of the time, your only lights are artificial since you're under the ground, sometimes in extremely narrow cavities. If you turn these lights off, you're in the most complete and perfect darkness you can imagine, and that forces you to rely on other sensations to understand your orientation. You're then in the water, under the Earth so to say, and in complete darkness.

Jeanne: It's like you belong to the Earth [Julie acquiesces].

Jean-François: So, in that case, your only sensation is the noise generated by your regulator and air tank.

Julie: If you're not diving in close circuit [which doesn't produce bubbles nor noise since expired air goes back in the artificial lungs of the circuit, instead of being expelled by the regulator in the water]. And there's the touch: you feel the rocks around you, you visualise what surrounds you through touching it, and these can guide you towards the cave's exit, furthermore if you also keep at hand the life-line, as we're constantly supposed to do in cave diving.

Jean-François: That is a difference between underwater and space: in diving, you can be in situations where you completely lose vision.

Julie: This is the visionless void I was mentioning earlier, this void becomes a set for multi-sensorial vision, deprived of visibility.

Jean-François: I don't recall experiencing a situation where audition played a role in verticality, with no vision at all.

Julie: It depends on the sounds because these can also be alarm signals in a cockpit, like the high-pitched stalling alarm in the cockpit when your aircraft is falling. This is a sound letting you know you're falling, vertically.

Jeanne: In dance, losing vision doesn't prevent you from dancing based on music, of course, but vision remains very important to rotate, jump, pirouetting, without hurting yourself. And this vision remains related to verticality.

Jean-François: In extreme environments, including outer space, high altitudes, or underwater, verticality is a major landmark, at least at the beginning. Only once you get acquainted with this extreme environment, once you manage to domesticate it a little bit, you can develop a certain margin of freedom from this verticality. Especially once you don't need it anymore...

Jeanne and Julie: ... to survive.

Jeanne: And dancing classes are about becoming conscious of your surrounding space. What I preferred in my dancing and theatre courses at

the Conservatoire of San Francisco, which has a very interesting theatre method based on the Other, was the way we learned to be consciousness of space. A consciousness of space more than self-consciousness: at which distance am I standing from the wall, where is the ceiling, or the floor. This consciousness is why we manage to dance and play as a comedian.

Julie: While in an aircraft, the cockpit is the interface through which we act on our surrounding environment. We know what gestures produces which effect on the environment, but we are never entirely in direct contact with this environment without the cockpit, or the diving life support equipment, as a mediator.

Jeanne: And without you or your body, the cockpit is lifeless.

Julie: True, it's a matter of how the pilot's body interfaces with the machine. Your verticality thus becomes inextricably connected with artefacts, and the technological interface you're relying on. Besides technology, we could also discuss technique, which is the know-how acquired through training and required to properly react accordingly to your environment. Technique is closer to dancing experiences.

Jeanne: This is probably why I choose dancing over continuing circus, for instance, because dancing offered me the freedom to work anywhere. When you talk about these artefacts you must manipulate, as a pilot or a diver, I feel a certain anxiety, because you're not alone and completely free from these machines: if these have a technical issue, you could have an issue yourself. This dependency generates anxiety for me. In dance, my only instrument is my body.

Jean-François: I feel like verticality has played a central role in our trainings for environments where it is less important and present. But there is always a time when you need to go back to the Earth's surface, either from outer space or underwater. And the exit towards the surface is always somewhere along verticality, either upwards or downwards. When we free ourselves from this verticality, this is to per-

form a job, and not to change our way of living ... so far.

Jeanne: Verticality is our landmark.

Julie: It is a playful toolkit.

Jean-François: You cannot avoid it on Earth because verticality is, under weightiness, materialised by visual, vestibular and touch solicitations. We, as astronauts, dancers and divers can decide to play with it and even get

rid of it once we are immersed in these environments. Nonetheless, verticality is indispensable even though we don't need it in these environments, because we need this verticality to go back to where we belong, which is where our body is made to survive without any supporting equipment or artifacts.

Paris, September 20th, 2022.



Seeing in Verticality: From 'Vertical Gaze' to 'Figuring Out'

4

Andrea Mubi Brighenti and Andrea Pavoni

Introduction: On the Arrogance of the Vertical Gaze

In 1978, the American artist Pope.L made his first crawling act through the streets of New York City. In the following years, his project evolved into more than 40 such extreme performances, each one no less than 20-mile long and lasting many hours, during which the artist—often dressed up in fancy disguises (a businessman, a superhero, etc.) and carrying along additional paraphernalia (a flower pot, a skateboard etc.)—would lay down and crawl through dirty, littered pavements and burning asphalt, often to the point of bleeding or fainting. Pope.L's performances forced bystanders to almost literally *look down upon* him as he struggled to make his way ahead, nearing exhaustion. In these performances, the horizon appears, we may say, tilted by 90 degrees, so that the pavement is turned into an almost impassable wall to climb at one's own peril. The artist is, in general, someone who pours an extreme effort to advance very little. A horizontal climber of city pavements, Pope.L also embodies

the point of view of those 'low beings' and those smaller creatures who, in the city and in society, are always looked down upon, if not *overlooked* altogether: babies, kids, dogs, rats, homeless people, social outcasts. As the artist himself puts it, 'In New York, verticality is the definitive *modus operandi*. Both buildings and people perpetually strive skyward, driven by tenuous dreams of upward mobility'.¹

Pope.L's performative gesture inherently provokes and interrogates many assumptions about the vertical gaze in the context of urban visuality and inter-visibility relations. One is reminded here that the classic Olympian view from above expresses a faith in order and control—one that, in turn, reinforces order and control. Verticality is not simply, as in Cartesian geometry, a rational way of observing space; it is, first of all, an advantaged position from which urban relations can be—and at least partially are—scaffolded. At the same time, though, verticality remains imbued with a whole sensorium of bodily inconveniences. As highlighted by Pope.L's performances, all sorts of inequalities—social, economic, cultural, racial...—sneak into the alleged clarity of top-down visuality. 'In most cities', the artist comments, 'if you can remain vertical and moving you deal with the world; this is urban power. But people who are forced to give

A. M. Brighenti (✉)
Department of Sociology, University of Trento,
Trento, Italy
e-mail: andrea.brighenti@unitn.it

A. Pavoni
DINAMIA'CET, ISCTE-IUL, Lisbon, Portugal
e-mail: andrea.pavoni@iscte-iul.pt

¹Quoted in: <https://news.artnet.com/art-world/pope-l-profile-1661419> (accessed Jan 1, 2023).

up their verticality are prey to all kinds of danger'.²

We could as likely speak of a certain type of *arrogance*: the vertical gaze of power, while claiming to rule for all, is extremely skewed, selective and exclusive. The selective inattention of the vertical gaze can be understood as a visual social pattern, or structure: in other words, the kind of highly asymmetric socio-spatial verticality that shapes the contemporary city seems to be premised largely on *not looking down* (as, indeed, in the climbing adage: 'Never look down...'): a peculiar type of inattention that corresponds to a mode of seeing ultimately unable, or unwilling, to *inhabit* verticality (Brightenti & Pavoni, 2020). The vulnerable precariousness of our age is revealed in verticality as a *tenuous* striving for something *more*—precisely, that consuming mode of hopefulness the cultural critic Lauren Berlant so piercingly captured with her formula, *cruel optimism* (Berlant, 2011). By reproducing this striving in the density of the street level, Pope.L caricatures it and, at the same time, points beyond it. Reflecting elsewhere on urban climbers, we pondered 'how a new form of "horizontality" (instead of having the subject "above" the object) can be achieved by pursuing an uncompromising verticality' (Brightenti & Pavoni, 2017: 7).

In the context of climbing, we argued, verticality could be understood as 'not simply a physical feature of the built environment, but as a form of experience and a relation between the body and the environment' (*ibid.*). In the case of Pope.L, we assist to a similar situation, but turned upside down. Here, it is indeed by pursuing an uncompromising horizontality that a new form of verticality is released: a paradoxically 'horizontal' verticality, a verticality that has survived the destitution of the socio-spatial, vertical logic of the contemporary city. In other words, Pope.L's work hints at a verticality that can be somehow inhabited, or at least embodied, although this requires a non-negligible effort, since there is neither a vertical gaze to rely on, nor a vertical

goal to strive towards, but only the materiality of a horizontality that must be *sought after* and *figured out* (more on figuring out below; cf. Simone, 2016). Does this entail that verticality is altogether gone, and what Pope.L offers is but an allegory of a life entrapped in horizontality? We do not think so. The fact is that Pope.L's performance presupposes a bird's-eye view that is not positioned somewhere above, over the city, but is immanent to the urban fabric itself. This peculiar vision that, at the same time, overlooks the urban and yet is folded into it, is what we are going to describe by borrowing Raymond Ruyer's notion of *survol*, as specifically instantiated in the digital urban context.

To do so, we first need to understand the constitution of perception in its peculiar relations to the city. Perception and the city have a deep, intimate story: suffice to recall that Leibniz moulded his philosophy of monadology upon the image of an act of perspectival urban observation. Ancient and modern utopias have been likewise crafted around the privileged ethical-aesthetic perspective, the 'Olympian' gaze. We need to ask: What is a city before any individual, 'human' eye comes to appraise it and, by perceiving it, also emplace it? What is a city before it is 'captured' from any given vantage point? Nothing, perhaps, but that 'an ensemble of images that exist in themselves, spectacle without spectator' (Ronchi, 2015: 110). Challenging as this Bergsonian expression may sound—a spectacle without spectator, is it still one at all?—we are willing here to follow its inspiration, outlining a notion of urban perception as something that emerges out of an impersonal, virtual eye looming over the field of the perceptible. Once the lens of immanence is rigorously applied, shouldn't we also recognise the 'power' of verticality as a flimsy type of wishful thinking, its alleged ordering capacity getting continuously circumvented by *other forms* of perception and relationality? And, if so, which other types of perception are to be considered?

In order to advance towards an answer, we invite the reader to a theoretical journey and a series of reflections developed in dialogue with the work of the British artist Stanza, who has

²Quoted in: <https://bombmagazine.org/articles/william-pope-l/> (accessed Jan 1, 2023).

kindly agreed to such an unconventional collaboration. Since the early 1990s, Stanza's work explores the intersection between space, perception, agency and control, as it emerges through the presence of digital technologies in urban space. Apparently, nothing could be farther from Pope.L than Stanza's 'data sculptures' and 'data paintings', made of hi-tech materials such as motherboards, circuits, cables, surveillance camera footage, data traces, algorithmic visualisations and so on.³ Yet, both Pope.L and Stanza, we believe, help us clarify the novel regime of urban perception emerging with the digital age. As we relate to Stanza's work, we seek to show how some of the impulses coming from his artistic production can be routed into an analysis of that scopic regime we suggest to call *seeing-in-verticality*. With such expression, we designate a contemporary condition where classical verticality is both technically perfected and, at the same time, conceptually and socially superseded. Of course, there is a clear difference between the way in which Pope.L folds verticality into his embodied, horizontal climbs, and the condition produced by the digital technologies. Discussing the notions of glitch, hesitation and figuring out, in the second part of the text, we reflect on the aesthetic, ethical and political distinctions between the two situations, in order to ponder their potentials.

The Constitution of Urban Perception

Now we suggest to take one step back, and consider a possible genealogy of urban perception. Another different form of verticality can be foregrounded in this way: each actually occurring, localised act of vision could be defined as the actualisation of a *virtual eye*. Following Bergson (1896), nature can be described as an infinite and uninterrupted single take of movement-images interminably acting and reacting upon one another. Within such a universe, perception necessarily takes place as the editing, or *montage*,

performed by (and *from* the standpoint of) a body that, acting as a contingent centre of perception and action, produces *a world*. Such a localisable world is what the biologist Jakob von Uexküll (2010/1934), with reference to animal experience, called *Umwelt*, that is a 'surrounding environment', which appears as the correlative to an animal's functional circle comprising the animal's capacity to be affected (perceiving) and affect (acting).

Actual perception, in other words, requires a selection and a partial obscuration of the real, that is, a deflection of the immanent plane of movement-images that make up the universe. We can thus be said to perceive by projecting our own shadow onto the multiplicity of movement-images, of which we are an integral part. In perception, the plane of nature is bent around a body, and it is out of such embodied point of view that any single given, actually occurring perception emerges.⁴ What we can retain here is that perception is inherently active, selective and corporeal: it unfolds as a sequential montage of 'takes' or 'captures' that, taken together, shape the meaningful environment of an animal—its *Umwelt*.

Current cognitive and ocular research attests that subjective visual perception occurs through *fragments—saccades* or eye jumps—reassembled into a seamless perceptual-cognitive stream. Our eye movements are immediately fixated upon certain patterns capable of conveying the meanings we are currently giving to a scene, in most cases working by anticipation and inference rather than by the actual visual data at our disposal: we see what we are ready to see, and adjust our visual beliefs on the basis of guesswork (Land, 2009).⁵ Accordingly, the phenomenon of interest is the co-occurrence of a discontinuous process and a continuous one, whereby concrete,

⁴Deleuze (1991/1966: 25) summarises the Bergsonian conception of perception by saying that: 'We perceive things where they are, perception puts us at once into matter, it is impersonal, and coincides with the perceived object'.

⁵See also 'The mind cannot override the affordances it sees', at: <https://medium.com/intuitionmachine/our-minds-see-and-hear-only-what-we-imagine-dc303056171> (accessed Jan 1, 2023).

³See the video at: <https://stanza.co.uk/theemergentcity/index.html> (accessed Jan 1, 2023).

situated montages of perceptual fragments are always supplemented by, and prolonged into, a peculiar, unifying and unified sensation. Such a state is what, for his part, the French philosopher Raymond Ruyer (2016/1952) called a *survol*.

A *survol* is a type of naturally produced vision placed at a different level of generality vis-à-vis the individual acts of perception that are related to it. The notion of *survol* hints at a peculiar type of synthetic vertical vision, which Ruyer (1958) referred to as a nondimensional ‘verticalism’: ‘My visual field necessarily sees itself through an “absolute” or “nondimensional Survey”. It [the visual field] surveys itself without positioning itself at a distance and in a perpendicular dimension’ (Ruyer, 2016/1952: 97). As Smith (2017: 123) explains in his commentary on Ruyer, ‘the details of perception are not linked to each other through causal links, like the parts of a machine, but are grasped in the immediacy of an absolute time-survey and space-survey, independent of any supplementary dimension’. The unifying virtual take of *survol* thus functions as the presupposition of a plurality of naturally occurring perceptual montages: it works as an ‘active inspection’ of the sense data, orchestrated by an organising principle. In psychological research, a similar process is known as ‘subitizing’, that is, the immediate apperception of a multiplicity (Kaufman et al., 1949). In other words, *survol* corresponds to a form of consciousness that ‘is not essentially perceptive or cognitive of spatiotemporal structures. It is essentially active and dynamic; it organizes spatiotemporal (organic or sensory) structures that are given in its field of survey’ (Ruyer, 2016/1952: 99). This means that, while perception is constituted by montage, the latter also needs to be supplemented by an immanently vertical apperception that functions like a virtual single take, in which each actual montage is presupposed. Looking for a convenient visualisation of *survol*, we can follow Stanza’s invitation ‘to imagine your conscience from a global perspective all at once’, as the subtitle of *America Is Bleeding* (2005) reads (Fig. 4.1).

The immanent verticality of *survol* allows Ruyer to postulate a non-transcendent foundation for per-

ception, preventing both the need for idealism to provide it with an archetypal foundation and the logical paradox of infinite regression deriving from the endless empirical locations where perception could potentially occur.⁶ Deleuze (1983: 81–83), in his reflections on decoupage in cinema, hints at a similar suggestive proposal: ‘If, from the point of view of the human eye, montage is undoubtedly a construction, from the point of view of another eye, it ceases to be one; it is the pure vision of a non-human eye, of an eye which would be in things’. The ‘other’, non-human or ‘thingly’ eye Deleuze speaks about—echoing Bergson’s image of nature as a photographic cliché taken directly ‘in the things themselves’—is not the transcendent eye of an all-seeing god, and has little to do with vertical Olympian vision; rather, it coincides with an eye that is immanent to the field of vision itself.

The state of *survol*, we suggest, can also be said to correspond to ‘the visible’, insofar as we conceptualise it as an immanently ‘excitable medium’ capable of hosting phenomena of sensibility, receptivity, inscription, projection and reactivity, that lie at the core of social life itself (Brightenti, 2017).⁷ The visible is a virtual expanse, whose connectivity enables the emergence of inherently relational configurations of meaning. Here, in particular, we are interested in how such notions as excitable medium, *survol* and virtual or immanent verticality may become useful when it comes to understanding the opera-

⁶Deleuze thus explains how the necessity of *survol* is rationalised by Ruyer: ‘my eyes would refer to a third eye, which would in turn refer to a fourth eye, if an absolute form were incapable of seeing itself and, in that way, of seeing all the details from its domain in all the areas from which it is located at the same time: *non-localizable linkages [liaisons non localisables]*’ (1988: 137).

⁷This resonates with Hansen’s interpretation of Ruyer: ‘Where phenomenology generically takes intentionality, the relation of consciousness to an object or the “aboutness” of consciousness, as a primitive, Ruyer’s philosophy of consciousness insists on absolute sensation as its foundation. Consciousness does not have a visual (or phenomenal) field as its intentional object. It is this field itself’ (Hansen, 2016: ix). In this vein, the late Merleau-Ponty (1964) had already framed the phenomenon of ‘the visible’ as something that occurs, not only impersonally, but also in a way that cuts across and entangles the visual and the haptic domains.

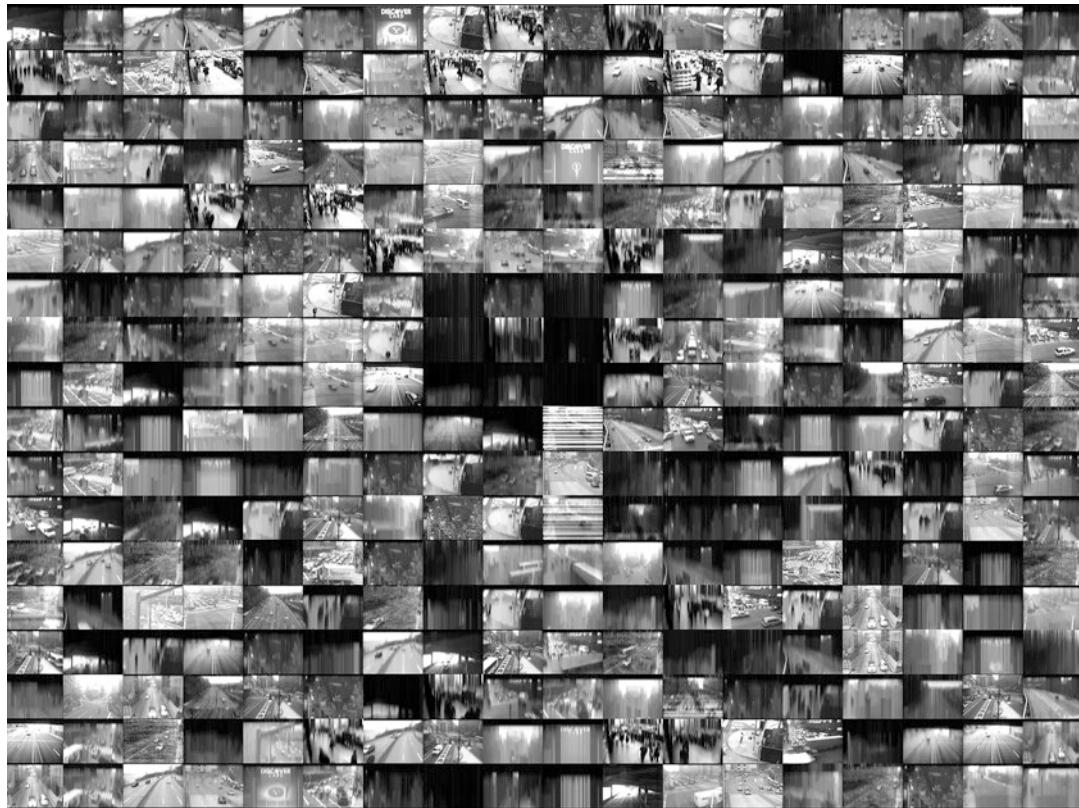


Fig. 4.1 *America Is Bleeding*. Networked cameras from all over New York created into online net artwork, 2005 (artwork by Stanza)

tions performed by the new urban technologies of vision, including visual technologies such as the drone and an array of non-visual digital networked infrastructures.

In the text accompanying *America Is Bleeding*, Stanza issues a challenging invitation: ‘Imagine being able to see the whole worlds from everyone else’s perspective’ (Fig. 4.1). The artwork is formed by a mosaic of countless images streamed in real-time from a network of USA-based surveillance cameras. ‘The computer manipulates the real time experiences and life of America as it unfolds’.⁸ In this case, the experience of *survol* is pivotal to what the artwork is keen on emphasising: not in the sense of simply looking *from* above, nor of adopting the privileged point of view of any hypothetical ‘inspector’. Rather, *survol* emerges as a perspective that is immanent to

the field of vision, whose logic unfolds algorithmically through the machine’s code of composition. What is all-encompassing is not our vision as viewers, but rather the immanent, algorithmic perspective that joins the ‘windowless’, monadic cameras together, by juxtaposing and networking them. This phenomenon could be described precisely as an instance of ‘machinic *survol*’ (see below), an eye-less vision that folds ‘normal’ vision from above into a different relationship between things that things themselves ignore: *seeing-in-verticality* (Fig. 4.2).

The Promise of Seamlessness

At first glance, the new digital urbanism seems to present itself as the logical end-point of the vertical thrust of the earliest cosmographic and geographic maps (Cosgrove, 2008). An achieved and

⁸https://www.stanza.co.uk/new_york_stories/.



Fig. 4.2 *The Nemesis Machine* in Madrid Spain. Cables Boards, Screens, IoT Networks, sensors, Custom Electronic Custom Software, 2010–2020 (artwork by Stanza)

perfected vertical vision would, in this vein, also mean the end of the outside, the coming about of an all-encompassing, omniscient computational reality. Such an ideal vertical vision seems consistent with the neo-finalistic notion of *survol*: the utopian, or perhaps dystopian, aspiration of an all-seeing vision in which the multiplicity of perspectives composing the city can be finally unified, and which digital machines promise to achieve. But, taken in this sense, the notion of *survol* can be easily charged with conjuring up apocalyptic descriptions of a totalitarian power which would hold by contemporary machine vision. Certainly, the contemporary urban regime ushered in by digital communication appears to be characterised by a technological state in which the uncanny non-human vision of digital computation increasingly acquires the capacity to control and orient the human uses of the city. Such invisible, impersonal vision corresponds to a ‘matrix’ that contains all the multiple and ‘incompossible’ viewpoints each body may singularly and discontinuously (ephem-

erally) occupy, and would effectively equate with a theological entity. The imagery of urban seamlessness evoked by the smart city rhetoric can clearly be traced from such conception.

However, we suggest, these same notions can also be interpreted in a non-finalistic way. Placing *survol* within the horizon of a philosophy of contingency paves the way for its possible, more fruitful use in empirical research. The conditions of *survol*, *subitising* or *visibilisation* can be kept distinct from the theological overtones typical of apocalyptic narratives, just as they can be disentangled from the imaginary of seamlessness that feeds the ‘solutionist’ promises accompanying these very technologies.⁹ Once such caveat is

⁹‘If there is finality here—suggests Deleuze (1988: 104) commenting on Ruyer’s *survol*—it is only what the mechanism is producing’. Elsewhere, we have referred to this as the ‘implicit normativity’ of contemporary digital computing, that is, ‘the cybernetic ethos of maximal efficiency, complemented by the technocratic ideology of solutionism’ (Brightenti & Pavoni, 2023: 16).

entered, we believe that the theoretical advantage of these conceptual tools is that they enable us to explore the fracture, but also the subtle co-implication, between the production of images and the effectuation of diagrams in urban space.

Questions concerning the imageability of urban space were first raised by the American urban planner Kevin Lynch (1960) in an attempt to construct a common, coherent image of the city, where the various 'mental maps' of its inhabitants could converge and harmonise. Today, the same questions can be rephrased in terms of the occurrence, *within the visible itself*, of a cleavage between, on the one hand, manifest, naturally occurring images and imaginations of the city and, on the other, machinic diagrams operating on the basis of data matrixes that resynthesise vision for all sorts of purposes. Algorithmic operations, such as those used in machine learning techniques and AI, have indeed opened the terrain for an otherwise paradoxical 'machinic vision' (Johnston, 1999), a vision dis-

tributed across networked digital fields and operating in increasingly seamless ways, before and beyond individual perception and imagination (Fig. 4.3).

Once placed within an empirical approach, the imagination of seamlessness that accompanies machinic and algorithmic vision can be discussed in terms of induced, locally manifested 'effects' that, far from being infallible, may as well *fail* to materialise. In this sense, continuity is never the beginning but always the end-point of a connecting process (see also Whitehead, 1978/1929): in other words, seamlessness is an effect correlative to an observer under specific premises and within given contexts. The fact that computation gives as an output an apparently seamless surface, endlessly mirrored across the small screens illuminating our faces, in fact hides its constitutively fragmented reality. An example in this vein is offered by NASA's *Blue Marble Generation* (2012), a collection of images of the whole planet taken from the space: whereas the image appears



Fig. 4.3 The Nemesis Machine in Madrid Spain. Cables Boards, Screens, IoT Networks, sensors, Custom Electronics Custom Software, 2010–2020 (artwork by Stanza)

as a single one, it in fact derives from ‘composites of massive quantities of remotely sensed data collected by satellite-borne sensors’ collected across different spaces, at different times. The composites are algorithmically reassembled to *produce*, rather than *represent*, what appears as a self-contained planet (Kurgan, 2013: 11). One can imagine it as fractured as the multiple mosaic in Stanza’s *America Is Bleeding* (Fig. 4.1).

Thus, empirically, the *survol* of contemporary computational programming is endlessly fractured by discontinuities, glitches, accidents, dis-

ruptions—an array of small and large ‘catastrophes’ that must be analysed and explained. In Fig. 4.4, Stanza pictorially reflects on the way in which, at the intersection of the physical and the digital spheres, individual trajectories shape the urban environment leaving multiple traces, marks and scars, some of which as tangible as a ‘desire line’, some others as intangible as a GoogleMap pin. ‘The artworks—writes the artist—represent the scars on the landscape that we have created by our inter-actions’, conjured up in the shape of ‘abstracted forms cre-

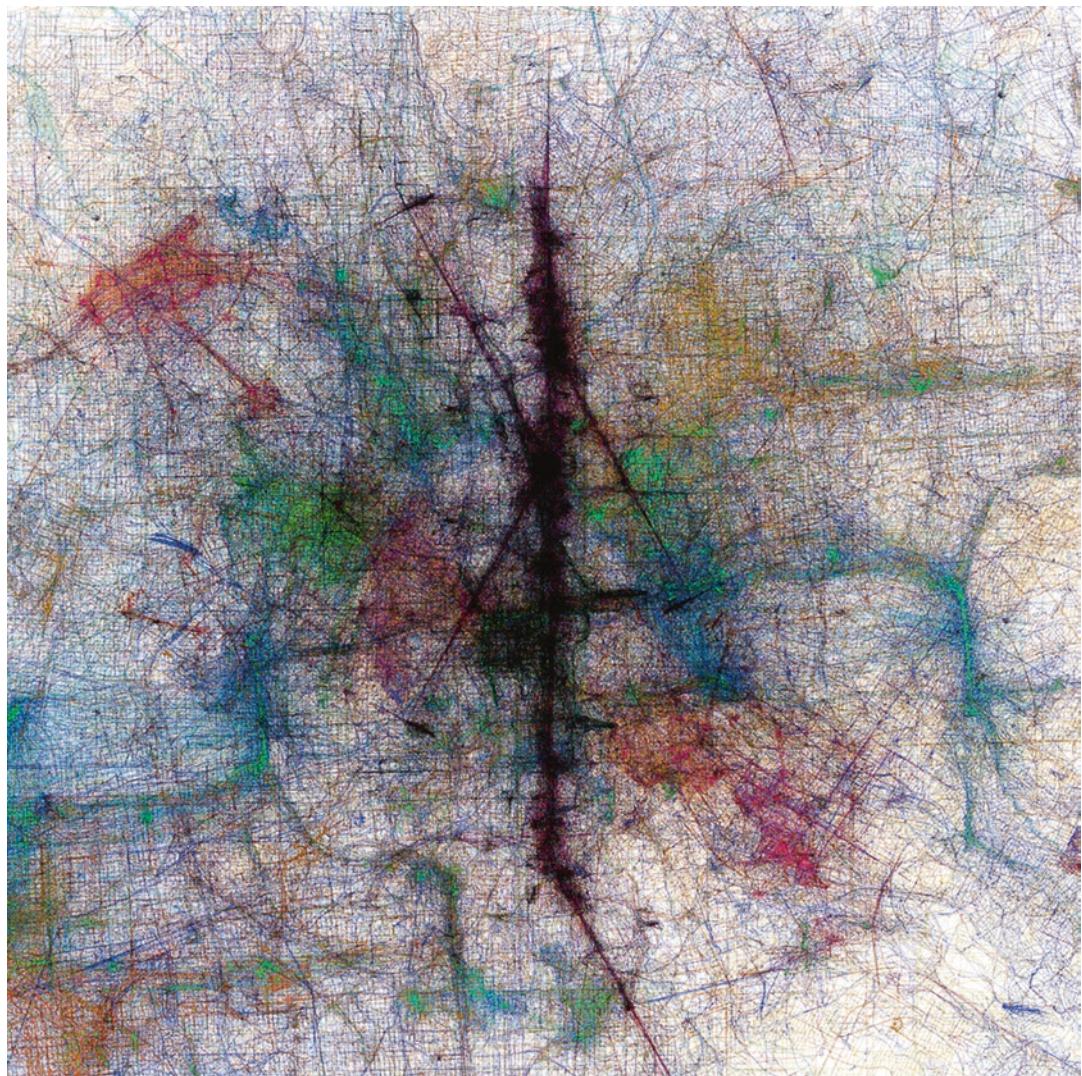


Fig. 4.4 Complexities. Surface Scars and Cuts. Exhibited at The Intelligent City exhibition, Bruges Museum 2015 (artwork by Stanza)

ated randomly or by chance but are in effect part of the fabric of the design of our global cities'.¹⁰ All too often, it is not *in spite of*, but rather *through* repeated failings—technically known as *bugs* or *glitches*, but which more evocatively Stanza calls *scars*—that digital urbanism unfolds.¹¹ It is, in other words, through glitches and scars that users can establish a relation with, as well as perhaps also challenge, the field of urban machinic vision.¹²

The French media theorist Paul Virilio famously argued that technologically mediated contemporary perception is fundamentally *static*, precisely insofar as it operates at the speed of light upon Earth (Virilio, 1976). In his later production, Virilio has also increasingly turned his attention towards the constant production of accidents and disruptions created by technical systems (Virilio, 2005). Tempering Virilio's overall apocalyptic tone, inspired by his ethical preoccupations, here we are similarly interested in highlighting the fine details of the accidental, in other words, the complex singularities in which the seemingly seamless world of machinic *survol* is diffracted into the complicated configurations of urban perception.

What is crucial, we suggest, is not so much 'the glitch' in itself, but the extent to which the glitch can operate like a cut *à la* Lucio Fontana, a gesture that pierces the canvas, potentially reconnecting the 'infrastructure of experience' to the 'experience of infrastructure' (Dourish & Bell, 2007). Vertical vision can similarly be revealed

¹⁰ https://stanza.co.uk/folio/complexity_surface_scars/index.html.

¹¹ There is a growing literature on so-called glitch politics (e.g. Russell, 2020; Elwood, 2021), where the notion of glitch assumes an important, ethico-political difference from the bug. Yu et al. (2022: 96), for instance, suggests that the bug entails a normative interpretation—that is, an 'error'—of the glitch, so that 'if the "glitch" is an opening of the possibility that the world might be otherwise, then the "bug" is a closure: this is an error'.

¹² It has been observed that there is a dialectic of visibility at the root of the system/failure relation. For instance, in the context of COVID-19 contact tracing apps in China, Yu, Brady and Zhao (2022: 96) have remarked that: 'Moments of failure render infrastructure abruptly and uncannily visible for entire communities'.

as folded in the fabric of everyday life as a type of seeing-in-verticality which expresses itself in its seams—as if they were symptoms communicating the inescapable materiality of the frictions that characterise acts of detection, translation and recognition. At this juncture, we encounter a *digital uncanny* that results, not only from the realisation of the extent to which urban fabric is algorithmically infiltrated, but also, in a more promising sense, from the fact that such infrastructure always contains unanticipated, animistic potentials (Ravetto-Biagioli, 2019; Brighenti & Kärrholm, 2020)—a fact that is going to be further amplified by the unpredictability of large-scale AI.

Such digital uncanny is tackled by Stanza in *The Nemesis Machine* (Figs. 4.2 and 4.3), an artwork which is offered to the viewer as a dystopian vision from above. In reality, though, what the viewer can see is nothing but bits, cables and connections, a 'data sculpture' utterly unreadable to the human eye—except, precisely, as that uncanny short-circuit of the underlying data flows. 'Imagine walking out the door, and knowing every single action, movement, sound, micro movement, pulse, and thread of information is being tracked, monitored, stored, analyzed, interpreted and logged'. Olympian vision here has nothing to do with knowledge and power anymore. It is a puzzled vision, further amplified by the impression of gigantism afforded by the possibility of walking through the model. At the same time, the artwork also 'asks how new technologies can imagine a world where we as citizens are liberated and empowered by using new technologies in an inclusive, connected, collaborative, and shared experience'.¹³

The Cognitive Mapping of Urban Navigation

What we have said so far should suffice to attest the tension between the classical Cartesian model of visuality and the new technological configurations in the visible (but also *of* the

¹³ <https://www.stanza.co.uk/theemergentcity/index.html>.

visible). In an analysis of the new-media city, Holert and Mende (2019) have argued, in this respect, that the way city users now operate is no longer mainly visual in nature, but *navigational*, whereby ‘navigation organises timescales and orders of magnitude that cannot be visualised simultaneously’. To the extent that *deep learning* algorithms are increasingly designed to perceive images as wholes rather than simple collections of analytical traits, the novel urban regime can be characterised by a machinic *survol* in which the analogue of a non-visual ‘view from above’ constantly accompanies and guides navigation. Lorenzo Tripodi (2020) has described in terms of ‘technological urbiquity’ the ensuing pre-structuring of the field of urban experience by digital computation. ‘This condition of constant global connection’, Tripodi writes, ‘allows virtual access to any place (or constructed visualization of a place) as well as any service or good, while being located and constantly tracked in a geographic position … Power pervasively infuses our environment and bodies. It is not perceived anymore in terms of capacity to overlook, looming from above; rather it penetrates or infiltrates’ (*ibid.* 436).

In this context, the paradigm of urban navigation designates a new generalised, remote accessibility of urban life. Similar preoccupations are also central to Stanza’s artworks. *Urban Generation* (Fig. 4.5) is presented by the artist as follows: ‘[It] looks like a filmic experience, but it is not a film. It is a real time experience of the city from multiple perspectives I call a “parallel reality”’. The situation of a parallel reality is—not differently from the navigational state explored by either Holert and Mende or Tripodi’s *urbiquity*—a vision in a state of *survol*. As Stanza (2015: 212) also explains, ‘we need to imagine the city at a different scale. The possibility is to extend our imagination and enable that perception of the city as a dynamic network’.¹⁴ This much *Urban Generation* accomplishes by stag-

ing the very material infrastructure—cables, fans, plugs, chips—of the emerging logistics of perception that contradistinguishes the digital city (Fig. 4.5). In resonance with *America is Bleeding*, *Urban Generation* is subtitled *Trying to imagine the world from everyone else’s perspective, all at once*. A virtual non-human eye in *survol* mode cannot, as we have noticed, be occupied by any actual individual observer, since it is a fragmented composition of countless perspectives algorithmically assembled at an inhuman level of speed and complexity. Its ‘vision’ has no resemblance with the human one: *en survol*, the city appears as a cybernetic fact, ‘a giant multi-user, multi-data sphere’ that hosts an ever-growing archive of traces and ‘liquid flows’.¹⁵ This way, Stanza’s artistic practice strategically conjures up a second-degree visualisation of the logistic of perception articulating the virtual ensemble of images extracted, combined and circulated—images out of which a whole *urbiquitous* state can be produced.

A map of the possibilities of such data expanse ready to be turned into perceptions would offer what Fredric Jameson (2007) once called a ‘cognitive mapping’. Jameson laid out the coordinates for such approach mixing the work of Kevin Lynch with that of the French philosopher Louis Althusser. According to Jameson, the peculiar condition of modernity lies in the split of experience and structure, first sanctioned by the expanded conditions of living brought about by imperialism, capitalism and globalisation. The ‘manifest image’ of the metropolis—the city as it is experientially presented to its users—is, in his interpretation, increasingly incompatible with its ‘scientific image’, which corresponds to the unreadable complexity of the entanglement of global forces and structures.¹⁶

¹⁴ ‘The artwork seeks to explore the rhizomatic multinodal networked experience’ (Stanza, 2015: 2010).

¹⁵ See the video at <https://stanzaco.uk/theemergentcity/index.html> (accessed Jan 1, 2023).

¹⁶ On the notions of manifest and scientific image, see Sellars (1960); on the application to cognitive mapping, Srnicek (2012). Hermant and Latour (1998) have similarly developed a monographic study of Paris through its invisible infrastructures.

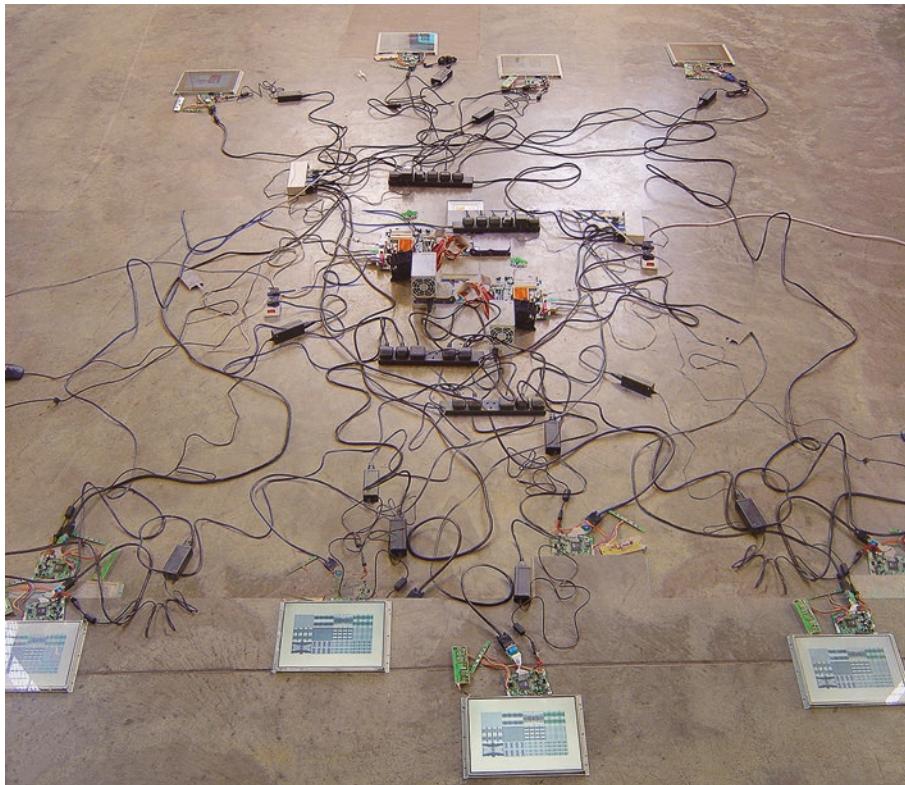


Fig. 4.5 Urban Generation. Installation Version. Wires, Cables, Screens, Net Art. Real-time software, 2002–2004 (artwork by Stanza)

Of course, this level of complexity is all the more daunting in a world of planetary urbanisation, informational and logistical interconnection. How to grasp the totality of this complexity? Is it actually possible? And, more radically: Does such a totality exist at all, or is the very attempt to reconstitute it itself a remainder of Olympian arrogance? Jameson was well aware of the conundrums and the epistemological *hybris* that the aesthetic form of the map encapsulates:

Cartography is not the solution, but rather the problem. The map, if there is to be one, must somehow emerge from the demands and constraints of the spatial perceptions of the individual. (Jameson, 2007: 158)

The point directly resonates with the question of the glitch. The glitch is potentially an error, that is, a 'bug', a faulty functioning of the algo-

rithmic infrastructure. Technically, understood as bug, the glitch is something to be *solved* as soon as possible; however, conceptually as well as politically, the glitch is precious in that it manifests the inescapably *frictional* nature of contemporary systems (Tsing, 2005).¹⁷ It is the sign that things are always to some extent already *broken*, and that brokenness does not necessarily call for repair and solution, but harbours in itself the potential for acting otherwise (Simone, 2022).

One of the tools deployed towards a cognitive mapping of the contemporary urban reality is the so-called visualisation. In the field of cybernetics and the digital media, visualisation has become synonymous with the requirement, not simply to make urban complexity readable, but also to

¹⁷ See Footnote 12, above.

‘make data actionable’—as per IBM’s formula. Cybernetic data visualisation, in other words, collapses seeing into *finding*, cognition into *recognition*, knowledge into *action*. If, in this new-media grammar, everything is reducible to data, it is because data are not simply relational, but above all *performative*. The media theorist Orit Halpern (2015) recalls the non-coincidental fact that Kevin Lynch had been a former student of the Hungarian art theorist György Kepes, whose 1944 essay *Language of Vision* investigated vision precisely in terms of ‘problems to be solved’ through data processing: according to Kepes, a ‘new order of objectivity’ would have had as a task to precisely overcome all the perceptual limitations of the human eye.

In her critical exploration of the logic of digital pattern recognition, Wendy Chun (2021: 185–230) shows the troubling effects of data visualisation, as something that automatically reproduces the social biases inscribed in the visual field. What is interesting for us is that this occurs due to the digital logistics of perception that is inscribed in the very functioning of pattern recognition, which reproduces, automatises, and thus *axiomatises* biases and inequalities. What ensues is a type of affective and sensorial *ankylosis*—literally, a stiffening causing an inability to sense *otherwise*—similar to the one described by Frantz Fanon (1970/1952) in the context of racism, which Alia Al-Saji (2014: 139) interprets as an atrophy of the capacity ‘to be affectively open to the difference and becoming of the lived body’. Al-Saji shows that racialisation functions as a sort of *automatisation* and objectification of perceptions and feelings, which somehow reduces, or *numbs*, that necessary interval of hesitation and ambivalence between perception, reflection and evaluation. It is only hesitation—interestingly, a notion first introduced into social theory by Gabriel Tarde (1893)—that allows experience and perception to unfold freely. Not simply depending on our conscious awareness, this phenomenological materialism allows us to explore a more surreptitious functioning of racism that seemingly infiltrates the social fabric like a poisonous toxin, hampering the perceptual plasticity of bodies by ‘paralyzing hesitation and objectify-

ing habit’ (*ibid.*, 154). The ‘incapacity to think’ shaped by algorithmic operational mode not by chance evokes Hannah Arendt’s ‘banality of evil’, which Donna Haraway has more recently described in terms of an incapacity ‘to make present to himself what was absent’, to be ‘response-able’ vis-à-vis difference (Haraway, 2016: 35–36). In this context, hesitation plays a strategic role: by opening a gap, or indeed a glitch, in the algorithmic racialising scheme, it allows us to become aware, once again capable of acting upon the skewed and patchy consistency of the perceptual field, as a sort of ‘deceleration that opens up the affective infrastructure of perception’ and that ‘can thus make felt the historicity, contingency, and sedimentation of habitual actions and perceptions, as well as their plasticity’ (Al-Saji, 2014: 147 and 143).

In the digital context, where algorithmic ‘intelligence’ further plunges skews, biases and injustice into invisibility (Noble, 2018; Benjamin, 2019; Espeland & Yung, 2019), the idea of *hesitation* resonates with the concept of *glitch*. Matters of hesitation and glitch also seem to inform the peculiarity of Stanza’s own way to data visualisation: instead of a positivistic effort to show ‘how things really are’, Stanza decides to dive, somewhat vertiginously, into the complex field of machinic vision. In this way akin in spirit to Pope.L’s urban crawls, Stanza proceeds through the folded verticality that shapes the new urban visibility by opening up an interval that defuses the totalising performativity of digital seamlessness, thus revealing the inherently patchy and fractured quality of machinic *survol*. Whereas, as considered above, machinic vision conflates vision, recognition and action from the perspective of an apparently coherent, seamless *survol*, Stanza proceeds to an archaeology of computing, giving emphasis to the limits and constraints of the apparatus. His artworks avoid both the production of seamlessness and the reproduction of the narrative of seamlessness. Stanza thus hints at a non-cartographic response to the aesthetic problem posed by contemporaneity, as per Jameson’s diagnosis: How to make perceptible those elusive forces, diagrams and rhythms that shape our being in the world? How

to decelerate the speed of digital flows to the rhythm of one's sensibility? (cf. Bifo & Guareschi, 1996; Srnicek, 2012). *Slowing down* does not so much lead to cybernetic data visualisation, but to the more mundane and ambivalent practice of *figuring out*.

New Potentials for 'Figuring Out' the Environment

The classic cosmographic dream of vertical gazing as well as its modern aeronautical-cosmonautical continuation in the twentieth century were still largely grounded in a human-centric ocular model of perception, which, as considered throughout, cybernetics and digitality have both perfected and superseded. The stage we are at can be approximated as a form of *seeing-in-verticality*: verticality is no longer something which we see, that is, an *object* of sight, but something *through which* things are seen, that is, a *medium* of visibilities. Such a new medium ('the visible') corresponds to the layering of a computational stratum upon the stratum of the perceptual materiality of the world ('movement-images', in Bergson's parlance). What above we have referred to as 'machinic vision' corresponds precisely to seeing-in-verticality—where seeing is no longer ocular, and verticality no longer bodily.

As perhaps with every new technological condition, art is necessarily at the forefront of the elaboration of, not only new analytical tools, but also new potentials for resistance. By resistance, we do not mean simple rejection, but an actual critical stance that is uniquely equipped for laying out the metaphysical and political coordinates of the technological condition (Brighenti, 2023). Whenever art introduces a critical factor of *hesitation* into perception, new practices become possible, and old practices get endowed with more potential for resistance. In this context, the practice of *figuring out* should not be discounted as the attempt to regain a lost privileged perceptual position, or as reinstituting the arrogance of the vertical gaze, but as the capacity to compensate for such a loss in ways that are creative rather

than simply reactive. As Toscano and Kinkle (2015) write, *figuring out* might be understood as 'not a question of accuracy or resemblance, in which aesthetic form would be a mere instrument for knowledge, but ... a kind of force-field in which our conceptions of both modes of production and aesthetic regimes are put to the test'.

As we inhabit increasingly calculative, formatted and programmed environments, where smart devices constantly provide data translations in terms of visualisations made available onto our pocketable screens, the functional need to figure out urban reality naturally decreases.¹⁸ At the same time, the conceptual link between seeing and knowing becomes tensional: the more we *see* (in an extremely compressed, almost comical version of vertical vision, gazing down, bent neck, onto our portable screens) the less we actually *know* (not simply as a result of the opacity of the digital algorithms, but also because our very capacity to relate to the environment is progressively curbed).¹⁹ The formatted—patchy, and yet visually seamless—quality of the urban environment as it appears shaped by the triangulation of GPS-enabled smartphones, location-based social networks, big data archives and machine learning algorithms, pre-emptively intuits and resolves for us all the perceptual problems we might encounter—problems of safety, desire, sociability etc.—limiting our task to the comfortable passivity of having to follow sets of given instructions—a condition that the common act of following GoogleMaps's lead illustrates sufficiently well. By attempting to systematically disburden the urbanite from the need to figure out the complexity of urban life (Simone, 2016), and by inducing a state of enhanced visibility of data,

¹⁸ 'If the desire to figure out the relationships among things is diminished as a by-product of increasingly formatted and programmed environments, then the very incentive for substantiating relational knowledge is undermined. This is the knowledge about how to act and how to make use of varying kinds of relations' (Simone, 2016: 149).

¹⁹ An incapacitation that is formally paralleled by the progressive atrophy the 'portable vertical vision' is producing on our physical body, see for example <https://www.verywellhealth.com/is-your-smart-phone-ruining-your-neck-297018> (accessed Jan 1, 2023).

thresholds, codes, signals, maps etc., smart navigability comes at the price of what has been poignantly called the user's 'functional stupidity' (Alvesson & Spicer, 2012).

Figuring out, we suggest accordingly, is a practice that emerges once we push ourselves beyond the limits of navigational visualisation, when we *hesitate* before the automated correlation between data and action suggested by our devices or enacted by AI applications. It is at that point, precisely, that we have to find out exactly what it is that we are seeing, beneath and beyond the impression of digital self-evidence and seamlessness. At that point, we have a chance to inhabit urban perception in a mode that is more tentative, more ambivalent, as well as more relational. As soon as an interval of hesitation is rescued to perception, as soon as the possibility of a systemic bug is even considered, resistance has a chance to manifest itself. The practice of figuring out thus recalls what the American design theorist Malcolm McCullough (2022) has proposed to call an *urban information environmentalism*: a new environmentalist stance is, indeed, called forth to inform a critical urbanism up to the requirements of the present. Concretely, for McCullough this means 'to emphasize the inhabitable scale of everything between the hand and the cloud' (*ibid.*, 57). By giving consistency to that medium of urban reality that is *informational yet not digital*, we can acquire and train the skills to enlarge the user's informational capacities beyond the entertainments of navigation. Accordingly, McCullough invites us re-evaluate the potential of *fascination*:

Fascination keeps coming back to something whereas entertainment must always move on. Fascination tunes in; entertainment tunes out. The pursuit of fascination resides in contexts of practices; the pursuit of entertainment quickly pulls out a glowing screen. Fascination maintains a reflectivity. In this it is very different, perhaps even opposite, from the restless, novelty-seeking visuality that the digital attention merchants so eagerly cultivate, harvest and monetize. For of course entertainment lives by overconsumption of informational empty calories. (*Ibid.*, 59)

Fascination can be an important complement to the practice of figuring out: notably, both have to do with recovering the unpredictability of the environment in a way that provides an alternative to the false animation of vision-in-verticality. Art can similarly invite us to accept the fact of coping with unpredictability, not as the tragedy we are doomed to endure, but as a prompt to act more creatively and unpredictably in our urban ways. All these are activities and gestures keep experimenting with the digital-navigational field of vision in a way that is not naively oppositional, nor technophobic. As Yuk Hui (2019) advances, it is a matter of actively 'modulating' the visual accidents that lie beyond the impression of seamlessness. Following Bernard Stiegler, Hui clarifies how the notion of modulation might be deployed by the artist as an important critical tool:

The artist is he or she who is able to modulate the essential sensible and the accidental sensible, and this modulation is also an act, which renders the accidents (in both senses of the word—namely, inessential and contingent) necessary. An artistic creation is a process through which the unexpected is expected, meaning that the accidents are conceived as necessary in the sense that they are now condition for a possible transformation. (Hui, 2019: 209)

In a broad sense, the new urban user finds itself in the very same position as the artist: both need to learn how to modulate the *toxicity* of seeing-in-verticality,²⁰ stepping out of the realm of *survol* and portability, into the domain of figuring out new ways towards further cognitive mapping and a whole new politics of urban perception.

Acknowledgment We are thankful to Stanza for kindly giving us the permission to use his pictures. Andrea Pavoni's research is funded by FCT/MCTES [CEECINST/00066/2018/CP1496/CT0001] and [PTDC/GES-URB/1053/2021].

²⁰The notion of the toxicity of data is also a leitmotif in Stanza's work. See <https://www.stanza.co.uk/folio/M-City/index.html> (accessed Jan 1, 2023).

References

- Al-Saji, A. (2014). Phenomenology of hesitation: Interrupting racializing habits of seeing. In E. Lee (Ed.), *Living alterities: Phenomenology, embodiment, and race* (pp. 133–172). State University of New York Press.
- Alvesson, M., & Spicer, A. (2012). A stupidity-based theory of organizations. *Journal of Management Studies*, 49(7), 1194–1220.
- Benjamin, R. (2019). *Race after technology: Abolitionist tools for the New Jim Code*. Wiley.
- Berardi, F. 'Bifo', & Guareschi, M. (1996). Presentazione. In F. Guattari (Ed.), *Caosmosi*. Costa & Nolan.
- Bergson, H. (1896). *Matière et mémoire. Essai sur la relation du corps à l'esprit*. Alcan.
- Berlant, L. (2011). *Cruel optimism*. Duke University Press.
- Brightenti, A. M. (2017). The visible. Element of social life. *Frontiers in Sociology*, 2(17), 1–11. <https://doi.org/10.3389/fsoc.2017.00017>
- Brightenti, A. M. (2023). *Elias Canetti and social theory*. Bloomsbury.
- Brightenti, A. M., & Kärrholm, M. (2020). *Animated lands*. University of Nebraska Press.
- Brightenti, A. M., & Pavoni, A. (2017). Airspacing the city: Where technophysics meets atmoculture. *Azimuth: Philosophical Coordinates in Modern and Contemporary Age*, 10(2), 91–103.
- Brightenti, A. M., & Pavoni, A. (2020). Vertical vision and atmocultural navigation. Notes on emerging urban scopic regimes. *Visual Studies*, 35(5), 429–441. <https://doi.org/10.1080/1472586X.2020.1840089>
- Brightenti, A. M., & Pavoni, A. (2023). On urban trajectology: Algorithmic mobilities and atmocultural navigation. *Distinktion: Journal of Social Theory*, 24(1), 40–63. <https://doi.org/10.1080/1600910X.2020.1861044>
- Chun, W. H. K. (2021). *Discriminating data: Correlation, neighborhoods, and the new politics of recognition*. The MIT Press.
- Cosgrove, D. (2008). *Geography & Vision. Seeing, imagining and representing the world*. Tauris.
- Deleuze, G. (1983). *L'image-mouvement. Cinéma I*. Minuit.
- Deleuze, G. (1988). *Le pli. Leibniz et le baroque*. Minuit.
- Deleuze, G. (1991/1966). *Bergsonism*. Zone Books.
- Dourish, P., and G. Bell. (2007). The infrastructure of experience and the experience of infrastructure. *Environment and Planning B: Planning and Design* 34(3), 414–30.
- Elwood, S. (2021). Digital geographies, feminist relationality, Black and queer code studies: Thriving otherwise. *Progress in Human Geography*, 45(2), 209–228.
- Espeland, W., & Yung, V. (2019). Ethical dimensions of quantification. *Social Science Information*, 58(2), 238–260.
- Fanon, F. (1970/1952). *Black skin, White masks*. Paladin.
- Halpern, O. (2015). *Beautiful data: A history of vision and reason since 1945*. Duke University Press.
- Hansen, M. D. (2016). Introduction: Form and phenomenon in Raymond Ruyer's philosophy. In R. Ruyer, *Neofinalism*. University of Minnesota Press.
- Haraway, D. (2016). *Staying with the Trouble: Making Kin in the Chthulucene*. Duke University Press.
- Hermant, É., & Latour, B. (1998). *Paris, ville invisible*. la Découverte.
- Holert, T., & Mende, D. (2019). Navigation beyond vision. Editorial. *e-flux journal*, 101. Retrieved January 1, 2023, from <https://www.e-flux.com/announcements/178893/e-flux-journal-issue-101-navigation-beyond-vision-guest-edited-by-tom-holert-and-doreen-mende/>
- Hui, Y. (2019). *Recursivity and contingency*. Rowman & Littlefield.
- Jameson, F. (2007). Modernism and imperialism. In Id. *The modernist papers*. Verso.
- Johnston, J. (1999). Machinic vision. *Critical Inquiry*, 6(1), 27–48.
- Kaufman, E. L., Lord, M. W., Reese, T. W., & Volkmann, J. (1949). The discrimination of visual number. *The American Journal of Psychology*, 62(4), 498–525.
- Kurgan, L. (2013). Close up at a Distance: Mapping, Technology, and Politics. Zone Books.
- Land, M. F. (2009). Vision, eye movements, and natural behavior. *Visual Neuroscience*, 26, 51–62.
- Lynch, K. (1960). *The image of the city*. MIT Press.
- McCullough, M. (2022). Urban information environmentalism. In A. M. Brightenti (Ed.), *The new politics of visibility* (pp. 57–71). Bristol.
- Merleau-Ponty, M. (1964). *Le visible et l'invisible*. Gallimard.
- Noble, S. U. (2018). *Algorithms of oppression: How search engines reinforce racism*. NYU Press.
- Ravetto-Biagioli, K. (2019). *Digital uncanny*. Oxford University Press.
- Ronchi, R. (2015). *Gilles Deleuze*. Feltrinelli.
- Russell, L. (2020). *Glitch feminism: A manifesto*. Verso Books.
- Ruyer, R. (1958). *La genèse des formes vivantes*. Flammarion.
- Ruyer, R. (2016/1952). *Neofinalism*. University of Minnesota Press.
- Sellars, W. S. (1960). Philosophy and the scientific image of man. In Id. *Empiricism and the philosophy of mind* (pp. 1–40). Routledge.
- Simone, A. M. (2016). The uninhabitable? In between collapsed yet still rigid distinctions. *Cultural Politics*, 12(2), 135–154.
- Simone, A. M. (2022). *The surrounds: Urban life within and beyond capture*. Duke University Press.
- Smith, D. W. (2017). Raymond Ruyer and the metaphysics of absolute forms. *Parrhesia*, 27, 116–128.
- Srnicek, N. (2012). *Navigating neoliberalism: Political aesthetics in an age of crisis*. Paper presented at *The Matter of Contradiction: Ungrounding the Object*, Vassivière, 8–9 September.

- Stanza. (2015). The emergent city: 2004–2012. In F. T. Marchese (Ed.), *Media art and the urban environment: Engendering public engagement with urban ecology* (pp. 203–224). Springer International Publishing.
- Tarde, G. (1893). *La logique sociale*. Alcan.
- Toscano, A., & Kinkle, J. (2015). *Cartographies of the absolute. An aesthetics of the economy for the twenty-first century*. Zero Books.
- Tripodi, L. (2020). Telescoping the city: Technological ubiquity, or perceiving ourselves from the above. *Space and Culture*, 23(4), 425–442.
- Tsing, A. L. (2005). *Friction: An ethnography of global connection*. Princeton University Press.
- Virilio, P. (1976). *L'in sécurité du territoire*. Stock.
- Virilio, P. (2005). *L'accident originel*. Galilée.
- Von Uexküll, J. (2010/1934). *A foray into the worlds of animals and humans: With a theory of meaning*. University of Minnesota Press.
- Whitehead, A. N. (1978/1929). *Process and reality*. The Free Press.
- Yu, Y., Brady, D., & Zhao, B. (2022). Digital geographies of the bug: A case study of China's contact tracing systems in the COVID-19. *Geoforum*, 137, 94–104.



Vertical Visualities, Experiences and Inequalities: A Conversation with Stephen Graham

5

Gary Bratchford, Stephen Graham,
and Dennis Zuev

*Stephen Graham is Professor of Cities and Society at the Global Urban Research Unit at Newcastle University, United Kingdom. He is a Fellow of the British Academy and the author of *Vertical: The City From Satellites to Bunkers* (2016; Verso). Prof. Graham's research and writings explore how cities and urban life are being transformed through transformations of infrastructure, mobility, digital media, militarisation and surveillance. His more recent work addresses the politics of urban security and the growing vertical reach of cities; Gary Bratchford is a senior lecturer at the University of Central Lancashire, United Kingdom, where he is currently the course leader for the postgraduate degree in Photography, chair of the Visual Culture Research Group and associate director for the Centre of Creative Practice Research. He is co-editor of *Visual Studies* and the president of the International Sociological Associations' Visual Sociology Research Committee; his most*

*recent book (with Zuev) is entitled, *Visual Sociology: Practice & Politics in Contested Spaces*. Dennis Zuev is an assistant professor at the University of St. Joseph, Macau and the head of the department of History and Heritage. He is also coordinator of the Research Lab in Cultural Sustainability.*

Taking a multi-disciplinary approach to the way in which we see cities and the ways in which cities are made visible, Bratchford and Zuev invite Graham to reflect on the vertical/visual dynamics that have shaped the way we visually understand, experience and imagine urban environments through a vertical lens. Focusing on atmosphere and the manufacturing on atmospheric inequalities, war, drone's satellites and a final note on the future of skyward analysis and sociological thought.

The three contributors meet online on 6 Oct 2022. The transcript has been edited for clarity and length.

Gary Bratchford: The thrust towards the verticalization of urban space has a number of logics, specifically when it comes to housing and the domestication of vertical space. Major cities in Asia, South America, and, latterly, the UK are three specifics but perhaps distinct cases. For some cities, such as Singapore and Hong Kong, the logic is driven by a lack of space and land. Whereas, in Brazil, much of the literature around the vertical urbanization in urban space is framed around a logic of securitization and daily life

G. Bratchford (✉)
Birmingham City University, Birmingham, UK

S. Graham
School of Architecture, Planning and Landscape,
Newcastle University, Newcastle upon Tyne, UK
e-mail: steve.graham@newcastle.ac.uk

D. Zuev
CIES-ISCTE, Lisbon, Portugal
University of Saint Joseph, Macau, China

(cite lite). While in the UK, specifically, one could argue is more about the spectacularisation of the urban environment which has historically been horizontal and largely low-rise.

What, if any social inequalities do you see emerging from this?

Stephen Graham: Well, I think the vertical segregation of cities is as old as cities themselves. You can go way back to ancient Rome and see that social hierarchies were embedded into multi-storied housing blocks. The apartment complexes of nineteenth-century Paris, after the Hausman projects, likewise, were vertically segregated. Again, there were complex vertical segregations with more affluent communities at ground level because being in the roofs was hugely problematic, without elevators, piped water supplies, plumbed sewerage, and so on.

Despite this, as I argue in my book, *Vertical: The City From Satellites to Bunkers* (2016; Verso), vertical social segregation is very poorly studied in the urban social science; horizontal segregations across geographic surfaces have dominated debates. Vertical social segregation is clearly very complex. It defies simple generalization; cities have their own path-dependent specificities and dynamics. As you say, we also need to remember that there are many cities where vertical urban living has been generalized through the widespread construction of more prosaic and ubiquitous apartment complex; such cities tend to present are much less polarized patterns than is now evident in so-called ‘alpha, global cities like New York and London. We must also add into this mix the post-war history of modernist mass social housing blocks in western nations and the widespread tendencies for such ‘projects’ to be cast as spaces of marginality.

But yes, as you say, in a lot of global cities where there’s a permissive planning regime and where planning and governance elites aspire to build vertical skylines—the vertical skyline is becoming a key global signifier of arrival and importance in terms of the centrality of the global city—extreme patterns of social segregation are rapidly emerging. We’re seeing proliferations of what I call luxified sky towers. These are the towers, for example in cities like Mumbai, New York,

and London, which commodify the vertical view down over the city from the lavish, extraordinarily spacious and secured raised apartments to an extreme degree. (Architects call this the ‘logic of luxury’). Such apartments are extremely expensive and are organized as investment vehicles for mobile, speculative capital drawn from global elites. (Within volatile contexts, real estate in cities like London and New York is seen as an ultimate safe haven for elite investments; often dirty money of problematic origin is recycled into speculative hyper-expensive verticalized condo towers).

As towers who’s first function is to house capital rather than people it is no surprise that many such buildings are occupied rarely and present largely dead or blank and unlit facades to the wider cities. Paradoxically, as their built environments are reshaped by the proliferation of myriads of tall, luxury, ‘housing’ towers, such cities are confronting deepening crises in the supply of affordable or social housing.

The idea of being of the city, but perhaps not *in* the city—at least within the open and tumultuous worlds of the ground level street—becomes a huge selling point for luxury housing towers. Another key point to stress is that these towers actually constituted incredibly *low* densities. It’s another paradox that traditionally we see housing towers as inevitably being about high-density living. After all, the whole idea of housing towers is to stack many dwellings vertically; their construction literally turns urban air into vertically-stacked living spaces. But if you look in detail at the emerging luxury towers, particularly in somewhere like Midtown Manhattan, this famous ‘Billionaire’s row’ just south of Central Park, which started with the construction of the 432 Park tower. A whole series of super skinny towers are emerging here. These offer remarkably low densities because each apartment occupies the floor plate of the entire tower. So, these towers—many of which are now taller than the Empire State building —are really stacks of extremely large apartments which radically commodify the spectacular views in all four directions. As hyper-expensive, often empty apartments bought as speculative assets for absent global elites who are

often using them to recycle and launder capital of very dubious provenance, they basically embody that sort of hyper-commodified speculative dynamic.

So, on the one hand we have these very often empty, low-density luxury housing units being built in cities like New York and London, and on the other we have unprecedented housing crises. In London the new architectural landscapes of luxury towers pepper-potted across the city's riverbanks represent the imposition of completely new architectural forms within very permissive planning regimes that are a legacy of Boris Johnson's regime as London mayor. And these are violently juxtaposed within the micro-geographies on the city with surrounding landscapes which are witnessing intensifying housing crises in terms of affordable and social housing.

I think what's interesting is the way these raised, elite spaces have been visually and linguistically coded and marketed as representing and embodying a powerful sense of social and class superiority over those who residents look down upon (at least when they inhabit their apartments). The marketing for such towers is made up of suggestions that raised, vertical, luxury living is both an entitlement born of extreme wealth and a powerful signifier of social superiority. Such marketing is replete with vertical metaphors, which in most human cultures are so widely used to describe social wealth, power, and social class that it is widely forgotten that such terms are metaphorical at all. ('Lower class', 'upper class', and 'sink estates' are examples in English.)

In places like Mumbai, for example, certain towers are sold as being literally "way above the rest". This slogan has been used to market the India Bulls tower in central Mumbai; another of the tower's marketing slogans is: "Wouldn't it be great to have the same address as God?" There's was also a notorious amazing advert for one in London, which depicts a resident banker rising upwards to arrive at his penthouse apartment. As he opens the blinds to gaze at the city below the narrator gushes "imagine what it's like to arrive with the world at your feet".

There are many layers whereby raised, vertical, luxury living is being coded here. Not surprisingly, questions of security are most evident in places like Guatemala City with very high levels of violent crime. Here wealthy, globalized, elites have been removing to sort of podium or plinth level—secured, raised platforms which offer social and leisure facilities which are removed from street level. Here there's a parallel coding of the vertical dimension in terms of class and insecurity—the lower you go into the city, down into the valley and ground level barrios, the more it's coded as insecure, as vulnerable—as a place not to go.

GB: Interesting. So, there is an interplay with vertical coding along with the visuality and experiential use of space related to advertising.

SG: Advertising is crucial and the role of the vertical metaphor—which is deeply coded into our sort of cognitive histories as remarkably verticalized humans who always must fight gravity and its risks and consequences. A strand of cognitive linguistics emphasizes how humans always use vertical motives so ubiquitously to denote social class and power that they cease to see these things as metaphorical. And, you know, the Latin origins of words like superior and inferior, superman and subhuman and all the rest is also important. Such linguistic traditions are exploited in the real estate marketing: 'way above the rest' and so on.

In cities such as São Paulo elite transportation and mobility questions add to this sense of elite vertical secession—and the voyeuristic experience of the ground-level city whilst enjoying radical removal from it. São Paulo is the poster child for vertical secession for the tiny number of elites who use helicopters to transcend the surface altogether. Such tiny groups experience a kind of helipad urbanism, dropping down onto helipads and on the tops of office towers, commercial towers, housing towers and exurban landscapes as well. A huge research and development effort is currently focusing on developing electrically-powered vertical takeoff and landing or e-VTOL vehicles to allow many more largely affluent groups to radically bypass the urban surface.

DZ: Yes, interesting. That's a very great connection with mobility. In Pearl River Delta in China, for some businessmen it can be normal to take a helicopter from Hong Kong and fly to Macau, it's the fastest way to get from one place to another. So, it's this kind of space junction, where we reside and how we transport related to inequality in the way people can move faster.

SG: It's often an assemblage that connects to sort of capsulized housing unit with the capsulized mobility system. And it's what Simon and I talked about in a book 20 years ago called 'splintering urbanism' through the deployment and use of new mobility systems that bypass and provide a sort of premium, secure, accelerated experience for those who can access them. We shouldn't forget the role of the elevator and all this, too. It has long been absolutely pivotal. As we have discussed, in Hausman's Paris and in ancient Rome, the upper stories were very much the domain of the poor, because it was such a logistical nightmare getting up and down to them on staircases in the absence of networked power, water and sanitation.

The use of elevators to vertically ascend and descend within towers and stacked buildings facilitates often very uneven processes of time-space compression in the vertical dimension—another process that has been remarkably neglected in literatures about urban social segregation (as well as urban transportation). Huge swathes of debates and disciplines address the politics, geographies and sociologies of transport and mobility in cities; within such literatures discussion of elevators as vertical and mobility systems within fast-verticalising cities is almost non-existent. This is especially problematic as the experience of elevators is being commodified, packaged, and marketed in all sorts of ways for elite and socially powerful users. The visual experience of elevator travel is important here, for example with the proliferation of transparent elevators that perform the visuality of ascension through being on the outside of the buildings or within building atria. There's also a race to offer premium, individualized elevators to elite users. Some of these even allow people to move their cars up to their apartments. So, there's an inter-

esting, important, and rather neglected discussion about the politics of the elevator here as well.

DZ: What about cable ways which you also mentioned in *Vertical*. Some cities are actually moving towards having more and more aerial cable ways. In Paris, they're planning to build new cable ways in the city also partly to, sort of, tackle with the congestion, but also giving the city a new look from above and maybe it's also kind of tourism strategy.

GB: Yes, I mean in a way the cable car as a technology is migrating away from the ski slopes into urban landscapes. And especially in Latin America.

SG: There are many, many examples in Rio and Latin American cities. Some embody progressive ideas of trying to incorporate informal urban neighbourhoods, which are very often built on remote and vertiginous urban slopes, into the wider city and its opportunities. But again, there's sometimes a politics of visuality and voyeurism here. Many of the ones in Rio, for example, allow the tourist gaze to peer down onto the favela, which is safely projected away and removed from the direct tourist experience because of tourists' fears about security and so on.

Vertical Viewing

GB: Yes, absolutely voyeuristic and this voyeurism is twinned with the experience of verticality. If we take this notion and apply it to conflict, what parallels can be drawn? We're increasingly being given vertical views of the reality of war between the various frames. Presently, we can look to Russia's attack on Ukraine but there's obviously other optics and wars which this can be applied to. What are your thoughts on the use of satellite images and drone images in terms of top-down images of landscapes, the real-time movement of troops and machinery, particularly in urban environments?

SG: Yes, I think it's a crucial point. I think I would probably emphasize a sort of rescaling of these gazes of these virtualities and perhaps an increasing sense of intimacy as the resolutions and the real-time engagement from above

improves. I mean, traditionally you could see the gaze of the bomber crew, for example, as being about a radical distantiation from the target—as being removed vertically and visually within a technoscientific world of abstraction and euphemism. (In World War 2, for example, RAF attacks on urban neighbourhoods were cast as a form of ‘dehousing’, for example). Such bomber crews in were normally radically removed from the messy and bloody realities of what was happening to human bodies on the ground. It was an abstract sense of landscapes and cities being targeted remotely (albeit at great risk to the crews). So, there’s a sense of distantiation there.

These days, there’s a huge proliferation of satellite and drone images which operate increasingly in real or near real-time. These systems have an amazing sense of resolution and the images and video that they produce are ubiquitously distributed around digital and social media. In Ukraine, as you say, imagery and video from weaponized drone attacks now offer the spectacle of individual attacks on single Russian soldiers.

Derek Gregory’s work is very powerful here. He has extensively studied the experience in the US of the operators of weaponized drones located famously in remote piloting facilities in Creech Air Force Base on the edge of the edge of Las Vegas. Such people operate drones on the neocolonial frontiers of Afghanistan, Pakistan, Somalia and elsewhere and undertake their lethal targeting from digitally enhanced capsules using global satellite links. Theirs is a routine, often nine to five jobs, where they’ll drive their SUVs home to the wife and kids after a shift.

The experience of such ‘pilots’ are often assumed to be distantiation and abstract. But Gregory’s work emphasizes that there’s an intimacy here. And there’s a level of trauma for these operators because, unlike bomber pilots and crew, they are in and of the violence that they project for extended periods of time as they circle over the aftermath of their strikes in ways that really do reveal the physical realities of what they’ve done to human beings on the ground. (Drone-based attacks are obviously hugely problematic in terms of war crimes and the killing of

civilians because drone pilots often go to great lengths to interpret the pixelated bodies before them as ‘terrorists’ or ‘insurgents’ to justify lethal attacks).

I would also say, however, that the gazes of the satellites, and to some extent, drones offer, offer new spaces for contested visual politics. The example I always use is the amazing example of the Bahraini uprising in 2011, which was part of the wider Arab Spring uprising across Africa, North Africa, and Gulf. Access to Google Earth images of Bahrain meant that, for the first time, the Shia majority who live in very congested and tightly packed parts of Bahrain were able to see the geographical geo-reengineered shifts in the Bahraini landscape organized by the Sunni elite. It became startlingly clear how the widespread terraforming of new, privatized, coastal land was being used to construct elite real estate projects inaccessible to the Shia majority who, consequently, were being systematically excluded from the coastline of their own country. And that realization was a hugely important trigger to the mobilization (which was suppressed violently).

GB: Just while we’re on the topic between drones and satellites, is there anything you think is still lacking or still understudied in terms of drone related research either in terms of geographies, aspects of vision or image production and dissemination?

SG: Yes, I think the world of what we call drones or unmanned aerial vehicles or whatever, is growing so quickly that I think it’s hard for researchers and literatures to keep up. I mean, traditionally, of course, the literature has focused on, as I say, remotely piloted military drones, particularly the United States, with its campaigns drone campaigns.

There’s a more recent literature on the use of smaller drones for rescaling, reorganizing digital photography, and the way the drone footage has become ubiquitous in film, in TV, in advertising and so on. But more recently I think that there’s a fast-emerging shift that really demand more attention. That’s the emergence of the drone assemblage as a logistics system.

There’s also question of the politics of urban air space. How, for example, do regulators and air

traffic control systems deal with the proliferation of aerial automated vehicles in and around cities? There are huge safety questions, insurance questions, technological questions, and traffic management questions here.

As I have already mentioned, another crucial development is the global development effort from various strands of the aviation and other on trying to take drone type technologies into urban transport systems to construct the called e-VTOL (electronic vertical takeoff and landing) or ‘advanced air mobility’ systems. These use electrically powered vehicles with batteries and motors. Some are piloted; some are not. A huge range of different experiments and designs are emerging. These raise all sorts of questions. Are we seeing a new urban transport revolution here? Is this just hype? Will these things actually transform how people move in and around cities? What will the politics of inequality, exclusion, and mobility (in)justice here? Will such systems be very elitist systems, or will they become mass systems? And what about risks and failures? If these things have ‘accidents’ similar to those that have plagued self-driving cars the whole transformation could be stillborn. And finally, I’d say the imaginary futures that are being used to justify these systems are fascinating. Because flying cars have long been such a staple of science fiction, a powerful *retro futurism* is often at play here. So, there’s an interesting relationship between histories of the future if you like and these experiments and projections. Also important is how certain cities are desperately trying to become hotbeds of experimentation for futuristic systems. Governing elites in Dubai, for example, are desperately trying to project the ‘City’ as being *of the future* through its role in the experimentation with EVTOL systems.

Manufacturing Air and Urban Air Crisis

GB: This rapid manufacture of culture, technologically or infrastructurally comes at a price to the climate and our atmospheres. For example, it’s estimated that data centres consume about 3

percent of the global electric supply and account for about 2 percent of total greenhouse emissions. That is comparable to the entire airline industry. The same can be said for Cryptocurrencies. According to recent finding at the University of Cambridge, the mining for crypto’s results in 0.55 per cent of the world’s energy production or roughly 110 Terawatt Hours per year. Moreover, a single cryptocurrency transaction uses the same amount of energy that an average American household uses in one month. If we take Bitcoin as one example, if look at where and how its mined, most Bitcoin mining is carried out in China, a state that is largely fuelled by cheap coal power. Taking all this in mind, we can pivot to your work on what you call ‘lethal domes’ of hot and polluted air, both in relation to the rise of vertical living and patterns of verticality, but also the human manufacture of air in highly built urban environments. Could you tell us a little bit about the lethal dome and the heat islands? And, what would be the visual perspectives? What are the visual indicators of lethal domes and how do you see this unfolding?

SG: Well, this is an enormous public health emergency that centres on the way increasing urbanization across the world construct their own political ecologies of polluted and heated air (the latter through the so-called ‘urban heat island’ effect). So, you have the combination of heat emergencies and pollution emergencies becoming incredibly lethal in many cities around the world. There’s a sort of mainstreaming of the heat emergency across the world as global warming combines with extending urbanization and the diffusion of air-conditioning (which merely exteriorizes heat to the urban outside, so accentuating the problem). There are many projections that certain especially Gulf and tropical cities are effectively going to be uninhabitable by the end of the century without the vast geoengineering of urban cooling and amelioration systems. So, there are many discussions of a kind of contemporary ‘airpocalypse’, particularly in China, where catastrophic smog and pollution, which combine urban heating with pollution from construction, internal combustion engines and the use of coal for industrial processes and electricity

generation. Such crises are shot through with huge environmental injustices and, again, vertical secession of groups into higher buildings and air-conditioned capsular spaces helps to ameliorate their exposure to polluted or super-heated air. (Notably the India Bulls tower in Mumbai, mentioned previously, is also marketed with the slogan “The higher you go, the cooler you get!").

There are even debates about whether extending urban regions are generating entirely new weather patterns. They're becoming so big that their heat and fluid dynamics are bringing into being new thermal landscapes of atmospheres. So, you're getting new weather patterns entirely. Istanbul, for example, now has tornadoes, which never happened before. But we can also talk about the paradox of air conditioning, which is probably less on the visual side: The way air-con provides interiorized, capsular, cooled spaces, but at the same time very much contributes to the warming of the city outside as the exterior deteriorates because air-con merely dumps extracted heat into the wider city.

SG: Visually we have an increasing politics of the interiority of certain, cooled, landscapes within atria, leisure complexes, malls, airports, theme parks, even airconditioned beaches and stadia. These are increasing in scale and ambition, as the interior ski slopes in Dubai demonstrate. Such interiorized landscapes of modified air present cyborgian landscapes which fuse the modification of organic and ‘natural’ landscapes, social landscapes, and technical landscapes.

Visually, we have other dimensions too as certain cities now are prone to regular and catastrophic smoke events, because they're near spontaneous forest fires or forest fires organized for slash and burn agriculture. So, Singapore, for example, suffers enormously because of its proximity to Indonesian fires. Vancouver's now increasingly at risk from the visual and health impacts created by the ash and smoke because of unrepresented wildfires within the adjacent forests of British Columbia's forests. These phenomena bring huge health impacts for urban residents, especially those with respiratory conditions, because of the dangers of inhaling smoking environments. For Vancouver, a city widely marketed

for its relatively pristine natural environments, these changes have been especially traumatic.

Again, on the visual side, there's also the sense the urban ‘airpocalypse’ changes the visual register of cities. This is far from new. Many of Turner's famous sunset paintings, for example, were shaped by the way that smoggy and smoky atmospheres of cities created spectacular visual effects. See we discussed and in the contemporary period in *Vertical* I quote a Van Damme, who's an Italian, inhabitant of Shanghai, who talks about the way the pollution of Shanghai effects its ambient light, particularly when the sun is low, to create as magical sense of urban sublime as the light interacts with the city's forests of tall towers.

The final point is about the ways in which heat and smog events remake the politics of urban visibility and invisibility. Governing elites, urban promoters, and real estate complexes keen to market new residential towers, are desperately trying to project, as I said earlier, their cities as global cities with emerging relevant skylines of highly designed skyscrapers, skylines and so on. But there's a paradox here that quite often these things are rendered invisible because of pollution crises. In Hong Kong, for example, this problem has led tourist management elites to put up plastic facsimile of the city's skyline on a sunny day to allow tourists to take skyline photographs when the real skyline is obscured during smog events.

DZ: Actually, it's a very interesting point that you mentioned, the skyline, because the skyline is always emerging. Some of the cities now in Asia are manufacturing or ‘reclaiming’ more and more land, so the coastline is constantly blocking the view of other estates where residents bought condos for their spectacular view. In Macau for instance, I saw the old residences that were built on the hill, but now they don't have the view because new lines, not even one row but several rows of buildings have been built and the view is actually an asset in real estate, and it's gone. And this is, I think, a very interesting point as well. And the air, as you say, as a part of the visuality of the city, is also very interesting. Because in Chinese cities, for instance, and the air actually

kind of equalizes people. Whether you're poor or rich, you want to see the blue sky, breath in fresh air.

SG: It does do that, of course. I mean, everybody has to breathe the atmospheres of these cities and it's difficult to escape it completely, but there, as I say, are secessionary tendencies at work here as well. In Beijing, for example, there's a well-known school for the children of elite western expats which has enclosed its exterior playing spaces within a plastic bubble which purifies the interior air using industrial air filters to protect the children whilst they are doing exercise. So, there's an increasing effort to build larger and larger capsules for those who can remove themselves from the exterior. When such capsular spaces are air-conditioned, as I say, they inevitably make the exterior hotter and more polluted. This partly because they dump the interior heat into the deteriorating urban exterior but also because the power they use is often generated in and around cities using polluting fossil fuels. So, there's a powerful politics of environmental injustice at the fine grain as such projects and technologies proliferate.

As Peter Sloterdijk states, air is designed and spatialized but also marketized. There's kind of a value-added commodity to air which is often overlooked?

SG: Well, yes, I also think of Bruno Latour's work and perhaps Tim Choy as well. More broadly lot more people are working on the politics of urban air now. They have brought air into social theory much more powerfully than the situation was, perhaps 15–20 years ago. Clearly, when air is healthy, clean and transparent, it's easy to take it for granted, to just render it as a sort of ubiquitous, and largely invisible, standard material domain. And generally, when it's weaponized or compromised, or becomes unhealthy, we start to recognize the political ecologies of urban air and the ways in which it has become lethal and debilitating on a quite extraordinary scale.

I love the quote from Elias Canetti, the philosopher, who talks about what he calls the 'defenselessness of breathing', the sense that humans expire without air within very short

spaces of time and rely fundamentally and continuously on accessing reasonable qualities of healthy air and oxygen. Without quality air, without oxygen, within two or three minutes we expire altogether. And the World Health Organization is now saying that urban air is dangerous and lethal. Urban air is now probably the largest killer from all the crises that are emerging during the Anthropocene. It's not just exterior air, which I think they say kills 5,000,000 a year or something like that. It's the lethal effects of interior air of people in informal cities, very often rural areas, that use wood and coal inside their houses.

So, there's a big growth of the critical and visual scholarship about the politics of urban and sort of multilayered spaces, drawing on Sloterdijk's work on terror from the air and weaponized air, and Bruno Latour's discussion about gas attacks. Contemporary crises of urban air raise all sorts of questions about how public regimes and public policies respond to urban, heat and pollution emergencies. Very often those responses remain absent at the collective level as individualized, marketized responses, with their extreme environmental injustices, run rampant.

We already have collective heating systems in many cold cities around the world. Can we construct collective cooling systems for hot cities, too? Can we make cooling an accessible public good for those vulnerable, marginal people, particularly the old, the weak, the young, the poor, and those with respiratory or other conditions, many of whom suffer disproportionately during urban heat and pollution crises at the moment?

We also need to raise questions about the weaponization of urban air—the ways in which air is deliberately manufactured to be toxic and lethal or at least nearly or, in the terminology of urban security forces, 'less lethal'. Here there's a powerful strand of literature looking at the history of tear gas, for example, something that's ubiquitous in the way state security forces try to control ground-level social and political mobilizations across the world which, effectively, amounts to a form of chemical warfare against urban civilians. We forget that this

is a series of chemical weapons that derive from the similar strands of weaponry used in World War One. Sure, they are less lethal than mustard gas and chlorine. But they are still hugely damaging, and sometimes lethal health-wise.

In terms of the environmental injustice questions, what's noticeable, I think, is that the capsules of attempted micromanaged climate are getting bigger and bigger. As I say in Dubai there are famous ski slopes and interior gardens and so on, but the projects across the Gulf, to render whole urban landscapes cool, getting more and more ambitious. You talk about air-conditioned beaches and huge suburban districts that are being designed as cool environments, as enclosed environments in response to this threat that urban futures will effectively become uninhabitable. But of course, we then have the exteriority deteriorating. The most extreme example of the lethal environmental injustices here, of course, comes from the mass deaths and health crises suffered by the millions of bonded South Asian labours who build these lavish urban complexes. This has, of course, reached new extremes as an estimated 6000 workers, condemned to work in near slave conditions within the heated and polluted exterior, have died during the construction of the vast assemblage of fully air-conditioned stadia, hotel complexes, leisure facilities and transport systems that Qatar has constructed for the 2022 football World Cup.

DZ: Saudi Arabian elites are planning this fantastic project of having a large linear urban complex in the desert and everybody's just thinking: "What is this? How is the cooling going to work? Who is going to move into the city in the desert?" How is this going to work?

SG: Such projects are becoming so large that they almost get to the scale of geo-engineering. As such, they relate closely to various futuristic and science fictional traditions and also to wider debates about planetary climate-change crises where Earth system scientists and engineers are talking about geo-engineering at planetary level. But the more these projects become super-urban and sub-regional, perhaps even quasi national with the megalomania of many of the ambitions

and in gulf ticking Saudi and UAE there's a huge question about greenwash too. I mean, we need to be very careful here because so much of the marketing and presentation of these projects, presents them as 'eco' or 'smart' cities which are inherently sustainable. But when you look at the real energy and material footprints of these projects, they're often catastrophically bad. For example, for coastal cities, you mentioned the land reclamation, it's not land reclamation, it's land *manufacture* which bring hugely problematic ecological impacts on marine ecosystems. So, we need to be very skeptical of this sort of mega-engineering and technocratic (indeed, technophilic) discourses, I think, and to really disentangle their visual and symbolic dimensions from their material and socio-spatial dimensions.

DZ: Yes, I think disentangling such projects visually is important. Crucial here is the widespread use of computer-generated imagery, which looks so perfect and seamless, and 'green'. Such imagery is superficially alluring. Everything which is out of the picture is completely forgotten and exactly this out of frame context nobody's talking about. What would be the ecological footprint of this?

SG: Absolutely. Gillian Rose's work on the digital representation of these projects is fantastic. As say the elites and seigneurs developing new city projects. What strikes me is that human beings are often *entirely absent* from these! The brochures and simulations instead depict luxurious, green landscapes of superficially sustainable cities. But when you look at the energy budgets and the water budgets, and the carbon, energy and water budgets of the cities' construction, they're often patently the most extreme greenwash projects that you can imagine.

Final Thoughts

Gary Bratchford: Thank you Stephen. It's been a real pleasure. As a final thought, where do we go from here in terms further unpacking a more thorough and longstanding sociological enquiry of the sky?

SG: Well, that's a really interesting question. How do we move forward? I think it's very clear. There's been a huge recent proliferation—various strands of theory and research in the arts, social sciences, humanities, and environmental research—dealing with what you might call the sociology of the sky. So, we're in a much healthier position than we were in, let's say 20 years ago, I think. But there are a few strands that might be worth revisiting. I think one might be the legal geographies and geopolitics of control of the volumes above the earth surface. Here we need to confront the politics of no-fly zones, the politics of orbits and geopolitics of orbital systems, the contested vertical views that the huge proliferation of aerial and orbital devices provide.

When I wrote *Vertical*, I was talking about 600 satellites. But now we have thousands of small low-orbit satellites being launched, particularly by private commercial space industry, which is booming for communications, for sensing, for all sorts of different societal applications. And the literatures on the vertical politics and geographies of satellites have been slow to get to grips with this huge proliferation of platforms operating at various orbital heights and niches, but also through atmospheric flight (for example with ultra-long endurance surveillance, ultra-high surveillance aircraft and balloons, and with drones and unpiloted aircraft used to deliver communications services)

Lisa Parks identifies the urgent need to bring satellites into our notion of the public realm because our societies are so satellite-enabled now. And yet satellites, which provide the fundamental orbital and verticalized background to so much of our electronic culture these days, have this sort of enigmatic presence which is always out there but are not directly sensed, visualized or experienced from the ground. This means that debates about the politics of the systems, in terms of geopolitics, ownership, control, state power, or even satellite-based vulnerabilities, all remain esoteric and specialized.

Another key agenda, going back to the question of the boom in e-VTOL experiments and

projects, is still neglected in literatures on the so-called ‘mobilities turn’, which has been a hugely productive vein of research in social science and humanities these past two decades. The huge research and development effort, huge range of experimentation going on, huge range of highly visible sort of performance, it's a futurity that are emerging these vehicles in various cities, and as I say, this raises interesting questions about the way certain urban elites work to make sure that their cities literally become contemporary spaces for the performance of futuristic aerial mobility systems.

SG: There's a literature in certain studies of the Gulf, for example, talking about the way elites in gulf states have a sort of retro-futurism because they grew up watching American pop sci-fi and reading American pop sci-fi. And the way so that they the argument here is that certain cities have a sort of retro-futuristic ambience, Shanghai, Dubai and so on. New e-VTOL imaginaries thus connect powerfully with commonplace historic versions of the future as the flying car looms large in any history of science fiction.

I think we have to take on board the emergence of commercial orbital travel (space tourism, and so on). Real estate agents are already speculating what would happen if super rich elites are able to move around the world on a daily basis using suborbital travel systems that are being projected and designed from the commercial space tourism systems that are out there now.

We also have a return of supersonic airliners, which is potentially very important. There's a company called Boom Supersonic which is marketing (and soon producing) a supersonic airliner that can transport 60–70 people at 1 1/2 times the speed of sound. Aircraft have already been developed by American Airlines, United Airlines, and Virgin Airlines. The emergence of a new network of supersonic air travel for between preeminent global cities brings all sorts of questions about elite politics of uneven mobility, time-space compression, carbon impacts, greenhouse gas impacts, and so on.

So, I think there's a few questions there in terms of the sort of politics of air space. As I say the intersection of discussions about geoengineering at a global scale and the increasing scale of suburban and regional enclave construction is important as part of this wider debate about the Anthropocene, planetary urbanization, and so on.

So, we're moving to sort of city-scaling air enclosures and city-scale weather modifications that the Chinese are doing a lot of these days. And also, as we have discussed there are lots of debates about how weather and climate can be weaponized in a time of climate emergency.

Dennis: Thank you so much, Stephen.

Part II

Sensing, Seeing, and Monitoring from Above



Repositioning Drone Sensing in Landscape Urbanism and Planning

6

Ole B. Jensen and Paul Cureton

Introduction

Modelling is a fundamental heuristic embedded in acts of design and evaluation in planning, architecture and urbanism. Coupled with this heuristic practice is the aerial nature of these experiments. A fundamental design act is to work in plan form on a 2D surface. However, a plan is an aerial position, an often-assumed objective nadir view of a site, regularly supported by parallel projection, elevation or section to be transformed through design and construction. In this sense, aerial viewpoints have been embedded from the outset of renaissance architectural practice in what Robin Evan's calls the "architect's faith that geometrically defined lines will engender something else more substantial..." (p. xxvi). Contemporary visual representational practices and production cultures are arguably often vertical (Bratchford & Zuev, 2020, p. 405). These practices and cultures of production are highly fluid and transformational and act as agents. For example, a map becomes the baseline for a site plan for future design intervention. For Le Corbusier, the aerial

view formed the litmus test for modernist intervention in city form (1935). For Charles Waldheim, remote aerial representation, mainly aerial photography, has had an indexical and instrumental transformational impact on landscape architecture. As Charles Waldheim states, "the idea of landscape has shifted from scenic and pictorial imagery to a highly managed surface best viewed, arranged, and coordinated from above" (Waldheim, 2016, p. 140). Waldheim discusses a technological development from the first photographs by Nadar (1863) to the contemporary age of publicly accessible satellite remote sensing, which enables and underpins landscape urbanist strategies.

Before aerial photography, the bird's-eye view was an 'imagined' landscape representational device used for design and transformation. Through primarily military applications, aerial photography's three most important technical elements are oblique photography, stereo photos and image mosaics, and techniques automated in today's Drone surveys (Cureton, 2020, pp. 43–45).

For example, civic aerial oblique photography, such as those taken at a low level by Harold Wingham, Fig. 6.1, uses varying light levels for shadow casts. The shadow formations would aid archaeological analysis (aerial archaeology began circa the 1920s), site interpretation and the identification of new landscape features, what Kitty Hauser calls the revealing of the unknown (2007). Such sun shading techniques feature in

O. B. Jensen (✉)
Aalborg University, Aalborg, Denmark
e-mail: obje@create.aau.dk

P. Cureton
Lancaster University, Lancaster, UK
e-mail: Paul.cureton@lancaster.ac.uk



Fig. 6.1 British Camp Iron Age hillfort, Colwall, Herefordshire, 16 August 1958. Also known as Herefordshire Beacon Camp. © Historic England Archive. Harold Wingham Collection HAW/9389/26

contemporary GIS software and are applied to digital surface models and laser scans.

The ubiquity of aerial photography and satellite imagery alongside the technological development of GIS systems from the development of SYMAP by Howard Fisher onwards (1963) cemented mapping as a practice in architecture, urban design and landscape architecture. The technological developments of aerial imagery and mapping fundamentally supported new practices and tactics proposed by James Corner through *Taking Measures Across the American Landscape* (Corner, 2000), with the aircraft pilot and photographer Alex S. Maclean (1996). Thus, in contemporary Landscape Urbanism, aerial representation placed landscape as part of the art of urban planning and urban design of in-between spaces and the horizontal field of hidden systems

and urban ecologies. Landscape Urbanism emerged from North-American Universities and professional practice (e.g. James Corner, Field Operations) in the late 1990s—“landscape as a medium of design in the context of the post-industrial social and environmental crises associated with shrinking cities” (Waldheim, 2016, p. 88). As Richard Weller asserts,

Landscape urbanism conjoins the methods and scales of planning with design; it focuses on the landscape as an infrastructural system; it appreciates the contemporary city as a hybridised, denatured ecology; and it aims for structural influence over contemporary urbanism. (Weller, 2008, p. 267)

The onset of Landscape Urbanism discussions and its contribution to reframing planning models has North American origins and empha-

sises process, temporal natures and complex systems in post-industrial cities. Propositions found in Landscape Urbanism are arguably intertwined with new tools and techniques of production using derived remote sensing spatial data as with other sources that became codified in new theorising and practice as a medium with a later unification with aspects of Ecological Urbanism (Thompson, 2012). Landscape Urbanism to Waldheim considers aerial photography a flatbed of horizontal representation and projection. A sense of verticality could only be derived using stereoscopic viewers (pair) photos. This paradigm has changed with the increasing sophistication of aerial surveys, instruments and GIS systems, drone surveys with near-real-time volumetric digital surface model sites, and in-situ data analysis in the field. Drones are very much part of that specialising continuation for geographic representation and interpretation of complex landscape systems that Landscape Urbanism has been calling for in its published texts and professional practice, and drone methodologies should be unpacked. This chapter's motivation is for drone methodological study and the discussion of the socio-technical relationships and knowledge formation, which is critical in a period of climatic shocks and a pressing need for the resilience of settlements of all scales.

The first consumer quadcopters with GPS systems and smartphone controls appeared from the company Parrot (2010), with DJI (2013) closely following, in a drone services market expected to grow to 40.7 Billion USD by 2026 from USD 13.9 Billion in 2021, at a CAGR of 23.8%.¹ The ubiquity of the drone is evidenced in the number of aerial images populating social media platforms (on Instagram, 4,702,510 posts using the hashtag #drones, 9,797,450 posts using the hashtag #dronephotography, 01-10-22). This SM drone imagery highlights landscape morphology and plays a

role in broader climate activism. This chapter, however, focuses on the ontologies of the drone, which need to be understood beyond aerial photography as an 'epistemological engine'. With this concept, we refer to the American philosopher of technology and post-phenomenologist Don Ihde and his ideas about technologies as tools framing the horizon of 'what we can know' (Ihde, 2016). Ihde often mentions Galilei's telescope as one such example. The various ways in which inventions such as telescopes, microscopes and other 'reading devices have been connected to what could be known leads Ihde to speak of these technologies as "epistemology engines"' (Ihde, 2016, p. 135). In the context of this chapter, this could, for example, be aerial imagery derived from Drones that commonly uses a Structure from Motion (SFM) photogrammetric range technique to estimate points from 2D images to create a 3D structure and model. The model can be used as a baseline in parametric modelling, 'designing in-situ' and interacted with through extended reality (XR) and the gamification of this data. Gamification is the application of gaming methods to non-game contexts (Deterding et al., 2011). Drone surveys may also be created for 'as-built' records as part of a construction contract or used for planning enforcement.² Standard commercial drones operate in airspace primarily between 0 and 400 ft, what has been termed a 'Nephosphere' (Garrett & Anderson, 2018, p. 343), but what can also be called a 'Hover Space', a temporal operative volume of airspace for drones. Drones are, therefore, active agents in design thinking and fundamentally embedded in design and planning decisions.

With the ever-increasing focus on social and environmental crises, drones as a tool can make critical contributions to future resilience. For example, at a city scale, a drone survey was used to create a 'reality mesh' (Fig. 6.2) as part of sev-

¹https://www.marketsandmarkets.com/Market-Reports/drone-services-market-80726041.html?gclid=Cj0KCQjwkOqZBhDNARIaACsbfLke-fmj2egxp4EpL4dg2w0fAxH2ouilbmgAjHmspBO_9B22DzBUu4aAqEREALw_wcB.

²See for example the RTPI, Section 1.3, Planning Enforcement Handbook for England (18/05/2020). https://www.rtpi.org.uk/practice/2020/may/planning-enforcement-handbook-for-england/#_Toc40421027.



Fig. 6.2 Wingtra AG, City of Zurich Mesh Model using a Wingtra Survey Drone. 800 ha (1980 ac) of the city centre at a GSD of 3.1 cm (1.2 in) in 6 flight hours, 2021

eral baseline data layers of the City of Zurich to create a ‘Digital Twin’ for urban planning, “a digital representation at a set fidelity, of a physical element including its behaviour, which is connected and integrated for efficiency” (Cureton and Hartley, 2024). In addition, these baseline studies enabled urban analytics through connected sensors for city air quality, 3D underground utility maps, buildings’ solar performance and other indicators for city resilience (Schrotter & Hürzeler, 2020).

Drones are dynamic devices shaping the future sociology of the sky, actively changing the terrain below. This agency is discussed through three lenses:

- Drones as devices for ‘Twinning Reality’ in creating high-accuracy mapping devices of physical space.
- Secondly, drones as agents actively shaping airspace through new mobilities and ‘hover space’, which require supporting infrastructure.
- Thirdly, as future shaping devices recording time-based processes of climate change and climate shock.

Twinning Reality

The current uses of drones in professional practice involve documentation, media for client-side presentations and various forms of mapping. Drones are applied in very different ways to the “inaugurating of new worlds out of old” speculations and the ‘Eidetic Agency of Mapping’ proposed by James Corner in the early phases of Landscape Urbanism (1999, p. 252). The landscape is not a tabula rasa for design speculation but via the drone, a high-fidelity 3D/4D mimetic volume of data to which computational predictions (computer vision and machine learning) are conducted or via cinematic composition, editing and narrative, creating a specific reality in which design activity is overlaid. There has since been explosive growth in Internet of Things (IoT) sensors such as smartphones, cloud computing services and other networks of physically connected devices from the birth of ubiquitous computing. Jennifer Gabrys has discussed environmental interest in sensing how environments and environmental relations are constructed with and through these technologies (2016, pp. 5–10). As part of the range of new sensing systems, the

drone provides high-fidelity real-time kinematic positioning (RTK), Drone Surveys around 1–3 cm Ground Sampling Distance (GSD), photogrammetric processing, multispectral imagery and integration in GIS software. Unmanned Aerial Vehicles (UAVs) may also carry additional payloads and sensing instruments. These sensing capabilities provide ‘virtual twins’ through reality capture. However, the forms of drone knowledge from these ubiquitous practices are highly revealing in our socio-technical relationships with new technologies.

The first phase of the sensing capability of the drone, ‘as a matter of fact’ in terms of precision ‘reality capture’ of spaces through photogrammetric processes and other sensing payloads. As Bret Milligan describes, drone surveys remove levels of abstraction from satellite imagery and embed the designer within site. This socio-technical configuration for fieldwork requires understanding media ecology in how the site aesthetic is co-constructed and interpreted (Milligan, 2019, p. 19). This embedding of the designer within the site is also reinforced through various UAV airspace regulations, such as maintaining a visual line of sight (VLOS) with the drone in operation and the transmission range of a ground station (controller) and UAV, for example, around 12 miles in a standard commercial drone, subject to weather and topographical conditions.

In addition, Rikke Munck Petersen suggests drone fieldwork videography can operate as an empathetic assemblage of movement, sight, sound and emergent touch, affection and care (2021, p. 1). This claim was developed through experimental research, and praxis in the ‘Rising Gale Affect’ film (2018) and ultimately identifies avenues for work in ‘More Than Human’ planning research.

The twinning of reality via the drone has other research developments. It addresses some long-standing areas of enquiry in landscape, planning and urban design in perception studies, apropos Phillip Thiel and Kevin Lynch. In developing new workflows for perceptions of riverscapes, Junjie Luo et al. (2022) utilised Unmanned Aerial Vehicles to generate new datasets for perception tests in the Tianjin section of the Grand Canal,

China (Fig. 6.3). The authors used UAVs to document panoramas of a linear 24 km section of the river. They used computer vision for semantic classification to create indicators on the level of artificial construction on the riverscape. This dataset was then tested via participation experiments using VR and non-immersive devices for visual perceptions using the indicators of “beauty, pleasure, tranquillity, colour, complexity, and liveliness” (p. 11). This study would ultimately inform development policies and decision-making based on spatial preferences and classifications and is indicative of UAV deployments streamlining fieldwork and generating new analytical possibilities through socio-visual analyses.

For Hunter’s Point Waterfront, a 9.5-acre post-industrial park in Long Island, New York, phase I opened in 2013, with phase II, 5.5 acres, in 2018, the SWA group, along with Penn State, conducted a post-occupancy study finding the project had a high level of resilience to coastal flooding and storm surge during and after Hurricane Sandy. Team members utilised drone-captured still photography and video fly-throughs, on-site hand-tabulated data, interviews, storm surge models and hydrodynamic modelling to analyse the site and usage. The study also used various tools and interventions for economic and social use (DuRussel & Singh, 2018). SWA’s case study indicates the deployment of drones across the landscape and urban design practices, which are used as part of or combined with various mixed methods design research tools.

The most significant development and near-future use of drones have been in the generation of repeat rapid reality capture surveys. For example, the ReMap Lima Project (2014) by Andy-Hudson Smith and Flora Roumpani, CASA, University College London, utilised fixed-wing drones at two sites, Barrios Altos and Jose Carlos Mariátegui, Lima Peru, coordinated ground mapping with the community, and then procedural modelling scenarios of unofficial growth (Roumpani, 2022). Thus, drone surveys provide fundamental urban modelling contributions in efforts for future collaborative and speculative

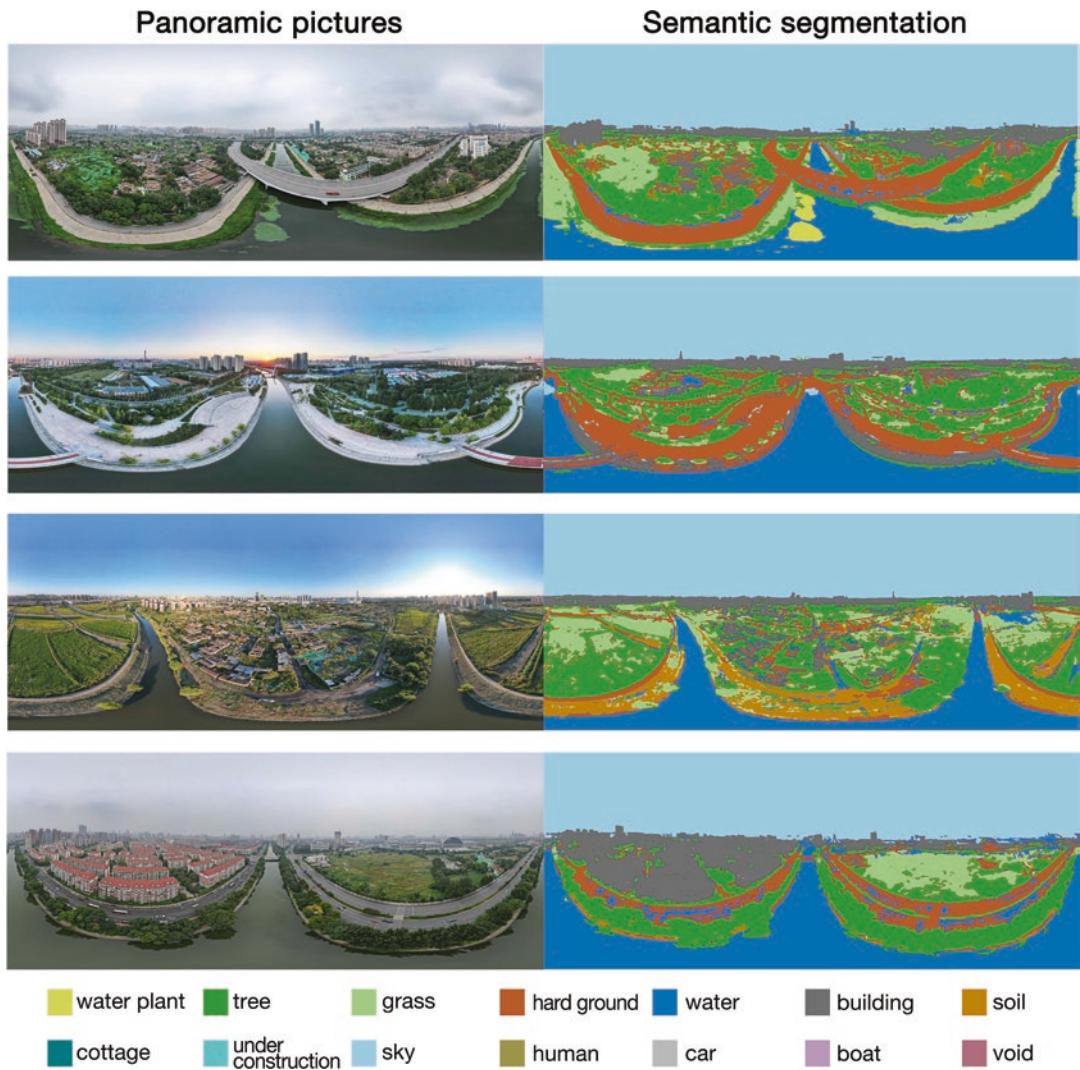


Fig. 6.3 Junjie Luo, Tianhong Zhao, Lei Cao, Filip Biljecki, 2022. UAV panoramic oblique images and their semantic segmentation results

procedural simulations. Drones (UAS, UAVs) provide data through navigation and sensing. As Andrea Mubi Brightenti and Andrea Pavoni state,

The ‘ground’ below is constantly de- and recomposed into a ‘mined’ constellation of bits of information, which are searched for patterns [...] reality is not simply made of images [...] but rather of mathematical data...which machines can decompose (mining). (Mubi Brightenti & Pavoni, 2020, p. 432)

This ‘mining’ of information via drone technology and sensing is best evidenced as part of

city information modelling (CIM) efforts towards ‘twinning’ reality, or the baseline steps of urban models towards connected Digital Twins in which the virtual replica is continuously updated across various sectors (Batty, 2018). Furthermore, the drone contribution to DT data is utilised through various landscape visualisation XR interactions, including FPV in-situ fieldwork and post-processing. The research challenges of these XR interactions have been discussed by Naoki Kikuchi et al. (2022). The drone as a method as one aspect of an epistemological engine, there-

fore, contributes to the virtual twinning of reality in order for the landscape or urban space to be decoded.

Aerial Mobility

We have discussed the sensing capability of the drone, in which we theorise that the drone is an epistemological engine. The second phase concerns invisible mobilities that are novel in drone deployment, which we term ‘matters of concern’ (waymarked paths, flight logs, sensing instructions, tracking, navigation of regulatory geofences etc...), which contribute to debates of atmosphere, volumetrics and airspace (Adey, 2010). Atmospheres emerge at the boundary between life and materiality—“the air and those things that move in it or with it or that it moves through—both living and inanimate matter” (Cureton et al., 2022, p. 131). Discussion of atmospheres aids a more profound discussion between aerial vehicles and stakeholders, often termed Urban Aerial Mobility (UAM), a term describing the variety of flight systems such as drones, including cargo drones, Vertical Take-off and Landing Craft (VTOL), air taxis, helicopters and aeroplanes managed in an Urban Traffic Management system (UTM). However, many debates are focused on the mobilities and infrastructure of the aeroplane, which have larger travel patterns and land demand. This subject has relevance for Landscape Urbanism. In his detailed account of landscape urbanism and emergence, Waldheim discusses the airport as a landscape for urbanism and the re-use of airport sites as public parks, for example Berlin’s Tempelhoff Airport (Waldheim, 2016, pp. 153–154).

For drones, operative in a broad sphere of aerial mobility, the possibility for counter-cultural practices, community-led implementations and deployment are much more pronounced. For example, the WeRobotics Flying Lab initiative provides training and support across various areas, from drones to agriculture, climate analysis and mitigation.³ In another case, in a discus-

sion of drone journalism and reporting from protest events in the United States, Caren Kaplan states that drones “contribute to the design and production of atmospheres and airspaces” (Kaplan, 2020, p. 2). The use of drones in and the worlds they make in political atmospheres reveals some immaterial qualities of the air through geofences, regulatory airspaces and restrictions (Adey, 2014). However, the agency of drone technologies and their constructed worlds is novel to the broader public. In a study of drone perceptions, a public dialogue through speculative artefacts and scenario methods to visualise the impact on their lives as part of the UKRI Future Flight Challenge was conducted (77 Public members, 12 special interest members, IPSOS-Mori). This research, through various design methods, used journey mapping and speculative objects for air mobility; future drone deliveries, vertical take-off and landing craft (VTOL), air taxis and air cargo (hybrid craft) and raised multiple concerns with the public sample including,

- Potential impacts on wildlife and the environment, and if these can be mitigated to an acceptable extent.
- How much noise pollution will it create, and how can this be mitigated?
- How sustainable can the production and powering of vehicles be (taking batteries into consideration)?
- How can these best work in unison with our existing infrastructure and transport?
- Safety assessment for likelihood and impact of collisions in the sky.
- Level of cyber security threat, and how to protect against it.
- How will future flight vehicles be affected by different weather conditions, particularly high wind?
- A cost-effectiveness analysis compared to investing in existing alternatives (public transport, electric/hydrogen road vehicles).
- Assessment of likely impact on jobs, and how skill sets can be re-purposed or retrained to mitigate this (Ipsos, 2022, pp. 43–44).

³<https://flyinglabs.org/use-cases/>.

Many of these public concerns raised cannot be discussed in full due to the limitations and remit of the chapter; however, these concerns raise various questions on the complexity of drone deployments and their impact on landscape, urban and regional planning. For example, Fritz Kleinschroth et al. utilised drone imagery across various landscape typologies and conducted a range of nine workshops for various stakeholders, with many perceptions echoing the UK Ipsos findings above. In addition, the study evaluated the potential of drone imagery for developing land management visions (Kleinschroth et al., 2022). Many of these drone perception issues have also been reported in integrating technology into landscape architecture curriculums (George & Park, 2020).

While perceptions and operations of drones emerge, discussion around the infrastructure for their operation has been limited in design fields to which such expertise is critical. In preparing the ground for new UAM, the design of systems and infrastructure supporting these new mobilities is essential in ‘whole’ system approaches. Drone docking bays, charging points, integration in Mobility as a Service (MaaS), large-scale skyports, landing pads, transitory nodes and logistics spaces are landscape sites as a medium for urbanism and mobility, just as Waldheim has claimed the airport in landscape urbanist site typologies. Two emerging indicative projects support such a claim, Drone Skyway, UK and ‘Air-One’, a VTOL Skyport, Coventry, UK. The 164-mile Skyway aims to connect the airspace above Reading, Oxford, Milton Keynes, Cambridge, Coventry and Rugby by mid-2024, and will receive more than £12 million in government funding. The skyway is connected by ground sensors and will have its UTM. Air-One is an operational hub for VTOL craft and autonomous delivery drones and is set for operation in 2023. Both projects propose carbon efficiency measures and reduced transport emissions, and other countries are developing such schemes, including Alphabet Inc. subsidiary Wing, in Australia and the USA.

A premise of Landscape Urbanism has been the design of horizontal surfaces from above as a

basis for eidetic mapping practice. However, UAM radically refocuses the attention on the landscape as a subject of a surface and places this within a volume of operation in transport-orientated development and mobility. How does Landscape Urbanism address volume? These indicative pilot projects intended for replicating multiple environments will provide drone infrastructure for agricultural applications and delivery and transportation across a highly dispersed surface akin to the visions of Frank Lloyd Wright’s Broadacre City along with the flying machines visualised in the scheme, albeit without the focus on the motor car (1932). Skyway and Air-One’s emergent projects reframe landscape urbanism’s discourse to discussions of atmosphere, volume and mobility for planning and revitalisation, post-industrial development, and flourishing and adaptive systems for climate resilience.

Shaping Aerial Futures

Drone infrastructure and UAM support the third strand of the epistemological engine of the drone in the post-processing of imagery through AI, computer vision and machine learning. This data-rich landscape highlights a socio-technical relationship in interpreting aerial time-based data or ‘drone knowledge’ for design and planning decisions made upon resulting models. For example, a current Harvard Graduate School of Design project led by Charles Waldheim (2016) examines Ed Ruscha’s photographic archive from the Getty Institute across an extensive timeline deploying generative adversarial neural networks to create various imaginaries based on the collection for the city of Los Angeles influenced by the AI data sculptures of Refik Anadol (Figs. 6.4 and 6.5). Researchers create thematic generative imaginaries in this project by classifying and arranging the original archive material. Such a project reveals contemporary research around knowledge formation that is purely computational. In the Urban Design field, similar experiments and workflows are being applied to street-level imagery for classification, perception



Fig. 6.4 Chunfeng Lu, 2021, A Glimpse of a Pleasure Garden, MLA22, Charles Waldheim Studio, “Shading Sunset: Reimagining the Streets of Los Angeles for a Warmer Future”, Harvard University, Graduate School of Design

(Lun et al., 2017; Qiu et al., 2021) and walkability (Yin & Wang, 2016), amongst many other applied areas of urban analysis. These activities are indicative of ‘Digital Cities’ discussed by the sociologist John Urry in which he describes futures in digital cities and the digital traces of people through multi-modal giant sensor ecosystems (Urry, 2016, p. 10).

In the context of the drone, such digitisation lends itself to fieldwork for environmental science and the mapping of environmental phenomena (Duffy et al., 2020). For example, in Karen M’Closkey and Keith VanDerSys, drone research recognises the technological shift of earth observation data as a basis for land cover classifications and, subsequently, its utilisation by designers.

Without earth observation technologies and modelling, we would not have knowledge about the rate of anthropogenic climate change, extent of pollution and loss of habitat, among many other concerns. (M’Closkey & VanDerSys, 2022, p. 35)

This work juxtaposes the National Land Cover Database (NLCD), USA, and other national models to showcase the primary attributions of cover and interpretation. Utilising a UAV, they created in-situ land cover data for high-resolution maps for design precision at a particularly challenging and changing marsh environment in Stone Harbour, Great Bay, New Jersey. This study revealed the complexities of representing change and image interpretation (Fig. 6.4).

In this case, the drone’s role is to highlight intangible qualities of salt marshes, their ecological flow and vegetation for a coastal community through durational mapping. This durational aspect is essential in capturing changing conditions, such as coastal seagrass, allowing a more detailed assessment of seagrass quality and disease presence (Duffy et al., 2018a). It is in the ecology and conservation fields that scientists have a detailed grasp of issues of drone deployments, from instrumental and airframe limita-

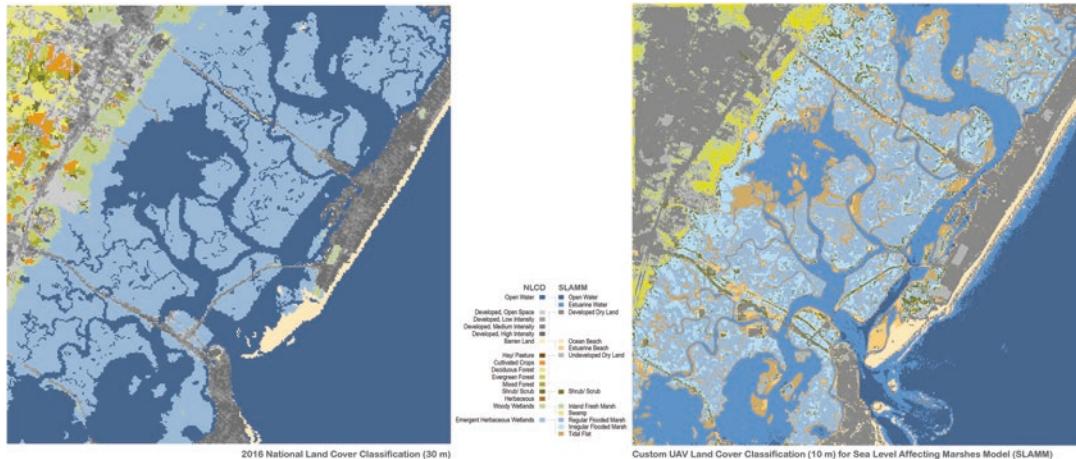


Fig. 6.5 Karen M'Closkey & Keith VanDerSys, 2022. Image comparing existing NLCD (left) and our site-surveyed high-resolution land cover data (right). The custom land cover was created using UAV multispectral imaging to train and recognise wetland plants and mudflats that were not otherwise depicted in the standardised NLCD

tions to deploying drones in broad environments, as well as discussing the ethical considerations of use and data quality (Duffy et al., 2018b). These insights into drone limitations and deployment issues require further investigative work for disciplines in the built environment.

Knowledges, Volumes, Futures: Discussion

As indicated at the outset of this chapter, we are generally interested in how drones may shape and enact what can be known. On a more detailed level, we are exploring what it may bring to our understanding of the materiality of spaces and landscapes. And finally, we have suggested that drones are active in mediating imaginaries about the future, or spoken different drones have futuring agency. Hence, we shall now shortly try to elevate these three themes to a set of more general matters of concern and debates.

Knowledges

As should be clear the drone (as many other technologies) might be understood as a tool shaping what we may know about the world. Being an epistemology engine is indeed related to the mat-

ters of concern where bringing new perspectives literally enables new viewpoints and thus insights as to how to deal with pressing issues. Seeing the land from the air brings new insights and knowledge about the ‘the state of the land’ in its most general term. As such the drone enacts matters of facts to emerge that would have otherwise been oblivious to human awareness. There is an inherent and deep relationship between knowing and sensing (‘sensing’ since there may be attached other technologies than cameras to the drone). For example, air quality sensors or thermic sensors). This is one where the land is ‘turned into information’ as it were. However, as with any other technology this is more than a descriptive framing and shaping of knowledge. The way the land becomes information and ultimately knowledge leans on a multitude of conditions and framings that cannot be said to be neutral in and of itself. The application of drone technologies to unearth facts about the land is both relying on particular interests in knowing about certain states of the land (e.g. an interest in watersheds or specific vegetations). But just as importantly, the ‘facts’ explored by drones tie into ways of defining not only problems but also solutions. Spoken differently, the drone is not simply an epistemology engine it also enacts an ‘epistemological politics’. By this we mean that the information and knowledge brought to the table by the drone

points in the direction of different choices, dilemmas and decisions. If a problematic condition of the land (say risk of flooding) is brought into the light as it were by the drone, it also brings with it an obligation (or at least an opportunity) to engage, discuss and deliberate about how this new knowledge should be applied. The drone is not only an epistemological engine but also a political one of sorts. Needless to say there is no determinism to this. Drone data may show the condition of the world to be in dire need of repair and yet we may ignore it. However, adding new knowledge to our awareness of the planetary state of affairs in a time of crisis suggest more than ignorance as the adequate political response. Having said this, we obviously realise that much of the current troubles with the climate might indeed be the fruits of ignorance. Nevertheless, drones and their ways if bringing new knowledge about the land carries with them a potential to enact obligations of deliberation and political action. This might be seen as a somewhat idealist position in the current situation. However, many of the examples we have presented here suggest that drone knowledge may indeed push political agendas when it is brought into the discussion. When it turns from matter of fact into matter of concern to use the terms of Latour (2005).

Volumes

Another vital dimension we have found when engaging with drones is the ways in which drone perspectives and knowledges enable new and deeper insights into the state of the material world. Here the touch points are manifold, but we would like to focus on a particular and at times overlooked dimension. What we are thinking of is the drone's capacity to add knowledge about the three-dimensionality of the world. In geography this dimension is known as the 'volumetric' (Elden, 2013). As geographers, architects and urbanists know; there is more to the land than area. The bird's eye images have as mentioned often led to 'flat projections' of the land and the world. Modernist urban planning with its primary concern of zoning is a case in point. However, we

are not inhabiting a 'flat land' but rather a material world of volumes under and above the ground surface (Jensen, 2020). The volumes between buildings, but also the topography of the land, are all about understanding the world volumetrically. The drone plays a significant role here due to its capacity for seamless movement in all three dimensions. Aerial video footage from a drone will quickly make clear that we are not seeing the landscape in strictly horizontal nor vertical ways. Rather the drone climbs up and dives down (almost) unhindered in the medium of air. The drone not only brings knowledge about the land 'seen from above' but it brings awareness that dunes, hills or buildings shape more complex geographies than we find on two-dimensional cartographies. These flat projections have become so intimately wedded to our ways of thinking about land, space and territory that facilitating a volumetric understanding of the world seems unfamiliar. There is, however, nothing strange or exotic about the fact that we live in a three-dimensional, material world. This we all experience in our daily life. And yet our cartographical imaginaries and projections have for a long been confined to flat, two-dimensional projections. The ways in which a drone may explore the volumetric properties of territories and lands is thus a quite important and rather under-explored potential and important addition to the scope of landscape urbanism. The capacity to move horizontally, vertically and with all the possible angles here in-between enables it to unblock the flat cartographies of modernist planning. This is important for the sake of better 'knowing the land'. But it also has repercussions for what we imagine to do with the land, and how we may rethink our relationship with territories and the land (Latour & Schultz, 2022). Here we may think of the notion of 'critical zone' as an inter/post-disciplinary platform for earth scientists, climatologists, geologists, philosophers, sociologists and geographers. In the words of Szweszyński the critical zone is:

the near surface layer of the Earth where most living things reside ... this region of the Earth's extended body is a complex, dense world, filled and folded, crowded with entities and processes,

movements and transformation, activity and signs, whose powers and conditions of existence are hard or impossible to disentangle. (Szwezynski, 2020, p. 344)

Gaillardet argues, that we do not live on Earth but on a ‘thin film, barely visible on a planetary view’ (2020, p. 122). Engaging with the critical zone of planetary existence might be vital for dealing with the climate crisis, and here there is a potential for volumetric, drone mappings as ways to fuel a holistic awareness of what goes on in the spaces we inhabit across species and scales.

Futures

The third theme we want to bring to attention is the ways in which drone technologies are related to imaginations of the future(s). Any technology comes into a world of ‘technological imaginaries’. By this we think of how it emerges within an already exiting cultural and technological context, and how it connects to manufactured ideas about future use of this specific technology as in the case of fiction and storytelling. Here the cultural-industrial complex of Hollywood cinematography has long been an important back-cloth to many of the current technologies conceived to be ‘futuristic’ (e.g. robots, drones, computers, Artificial Intelligence etc). Drones are immersed into a cultural horizon of stories about the affordances and capabilities of the technology. But also about its capacities to bring different futures. Needless to say, the ‘matter of fact capacities’ of the technology (e.g. for drones to fly across inaccessible land such as mountains or jams of cars) are important. But so are the collective ways in which we imagine the technologies to alter the present. Hence, the technological imaginary that the drone becomes sits somewhere between its technical capacities and our imaginaries of what this may lead to.

In the context of this we want to draw upon Urry’s sobering remarks that one need to be careful not to conflate the possible with the preferable or the probable when thinking about futures (2016). Much contemporary politics seems to be fuelled by a conflation of what is preferable with

what is possible. That might be what one would want; politicians that dare put their visions, dreams and imaginaries forward a guiding beacon for future action instead of mechanic extrapolation of current ‘trends’. Imagining futures is a complex field of investigation and one might see it as an anthropological constant. In other words, all societies have had specialists imagining the future such as ‘*prophets, diviners, seers, oracles, witches, technologists, sages, astrologers, clairvoyants, novelists, wizards, futurologists, fortune tellers* and so on’ (Urry, 2016, p. 18). The reason this is of relevance in a chapter on drones is nicely framed by Urry when he speaks of recapturing the future as a field of interest not only to social science, but to society at large. Much future-thinking has been appropriated by governments, corporations and military. Time is ripe, Urry argued, for ‘democratising futures’ (p. 13). Bringing out the conversation of matters of concern to public deliberation is not a technological issue. However, some technologies may indeed carry a potential for democratising. Drone footages, drone images, and drone perspectives may actually bring new knowledge to the conversation. Moreover, many drones are now able to be operated by low-cost, high-agility civil society groups and individuals. This enables them to utilise the drone’s capacities to make new knowledge into a conversation of what to do, where to go. Making new maps of pollution, flooding or uneven social geographies with the enactment of the drone become powerful tools not only in the hands of governments and corporations.

Obviously, there are also military, government and corporate drone future imaginaries. These may not necessarily make for a more democratic visioning of the future. To take Urry’s warning seriously one must be careful not to conflate wishes for a democratic conversation of the future with the probability hereof. On the other hand, imagining futures and setting out goals for them relies on hope (Ingold, 2022, p. 332; Urry, 2016, p. 192) and creative speculation (Dunne & Raby, 2013). Imagining democratic drone futures might thus involve some elements of utopian thinking. Reinvigorating utopian thinking in social analysis is, therefore, to apply a form of

'speculative sociology' (Levitas, 2013, p. 85) where we may envision a space for the drone not only as technology but also as an evocative artefact that may connect new forms of knowing about the land with imaginaries of how to act upon this knowledge and this land.

The drones are not determinist or preconditioned technologies (no technology is). However, they do bring quite exciting new perspectives into the ways in which we get to know about the land, the territory and the world. This may have repercussions for climate action and policy. However, it is also of importance for landscape urbanism and planning. Being in its infancy as a professional tool, we wanted to raise some of the many matters of concern that the drone connects to when we want to think about it as a tool for urbanism and planning.

Conclusion

Landscape Urbanism is a model shift for revitalising post-industrial cities and edges. Waldheim's view is that landscape,

Offers a cultural milieu and medium of design equally at ease with natural succession and cultivation, existing description, and new intervention. In this regard, the landscape has emerged in recent years as offering a new disciplinary framework for approaching sites of the formerly urban. (Waldheim, 2016, p. 93)

The drone, in this context, very much contributes as a medium and epistemological engine and the three discussed facets. The first was the sensing capability of the drone, which has discussed the resolution in terms of precision 'reality capture' of spaces and virtual twinning, as well as embedding the designer in a site. The second phase orientates the drone as a device that reveals the atmosphere. UAM highlights the public perceptions of the volume of airspace and the fears around such future operations. Future built environment infrastructure for UAM forces the landscape as a surface to become embroiled in discussions of volume and atmosphere. Thirdly, new computational techniques using drone data raise questions

about our socio-technical relationship in interpretation. These three facets of the epistemological engine of the drone raise further research questions about the suitability of many of the methods discussed to create a new drone agenda and identify positive environmental sociological futures raised in the discussion. The discussion has raised essential areas for further investigative work for the drone and built environment research community around technological knowledge formation, volumes and futuring methods. This area of work could involve co-creating ontological maps of environmental futures through ontographic methods and contributions towards the speculative sociology of the sky. Finally, the drone as a medium for knowledge must be situated in novel, post-disciplinary methods for drone futures for climate resilience. These investigations and methods could include fieldwork methods in sensing capabilities, investigating the social-technical lens and exploring the philosophies of new robotic technologies and urbanism.

References

- Adey, P. (2010). *Aerial life: Spaces, mobilities, affects*. Wiley-Blackwell.
- Adey, P. (2014). Security atmospheres or the crystallisation of worlds. *Environment and Planning D: Society and Space*, 32(5), 834–851.
- Batty, M. (2018). Digital twins. *Environment and Planning B: Urban Analytics and City Science*, 45(5), 817–820. <https://doi.org/10.1177/2399808318796416>
- Bratchford, G., & Zuev, D. (2020). Aerial visibilities: Towards a visual sociology of the sky introduction to the special issue. *Visual Studies*, 35(5), 402–416. <https://doi.org/10.1080/1472586X.2020.1843283>
- Corner, J. (1999). The agency of mapping, speculation, critique and invention. In D. Cosgrove (Ed.), *Mappings*. Reaktion.
- Corner, J. (2000). *Taking measures across the American landscape*. Yale University Press.
- Cureton, P. (2020). *Drone futures: UAS in landscape & urban design*. Routledge.
- Cureton, P., Griffiths, R., & Dunn, N. (2022). Above and Beyond Aerial Technologies, Atmosphere and Landscape. In K. Bishop & L. Corkery. (Eds.), *Routledge Handbook of Urban Landscape Research* (1st ed.). Routledge. <https://doi.org/10.4324/9781003109563>

- Cureton, P., & Hartley, E. (2024). *Geodesign & Urban Futures*. New York: Routledge.
- Deterding, S., Dixon, D., Khaled, R., & Nacke, L. E. (2011). *From game design elements to gamefulness: Defining "gamification"*. Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments. ACM. <https://doi.org/10.1145/2181037.2181040>
- Duffy, J. P., Anderson, K., Shapiro, A., Spina Avino, F., DeBell, L., & Glover-Kapfer, P. (2020). *WWF Conservation Technology Series, 1(5)*.
- Duffy, J. P., Pratt, L., Anderson, K., Land, P. E., & Shutler, J. D. (2018a). Spatial assessment of intertidal seagrass meadows using optical imaging systems and a lightweight drone. *Estuarine, Coastal and Shelf Science*, 200, 169–180. <https://doi.org/10.1016/j.ecss.2017.11.001>
- Duffy, J. P., Cunliffe, A. M., DeBell, L., Sandbrook, C., Wich, S. A., Shutler, J. D., Myers-Smith, I. H., Varela, M. R., & Anderson, K. (2018b). Location, location, location: Considerations when using lightweight drones in challenging environments. *Remote Sensing in Ecology and Conservation*, 4, 7–19. <https://doi.org/10.1002/rse2.58>
- Dunne, A., & Raby, F. (2013). *Speculative everything design, fiction, and social dreaming*. MIT Press.
- DuRussel, L., & Singh, A. (2018). *Hunter's Point South Waterfront Park, phase 1 methods*. The Landscape Performance Series. Landscape Architecture Foundation. <https://doi.org/10.31353/cs1371>
- Elden, S. (2013). Secure the volume: Vertical geopolitics and the depth of power. *Political Geography*, 34, 35–51.
- Gabrys, J. (2016). *Program Earth: Environmental sensing technology and the making of a computational planet*. University of Minnesota Press.
- Gaillardet, J. (2020). The critical zone, a buffer zone, the human habitat. In B. Latour & P. Weil (Eds.), *Critical zones. The science and politics of landing on Earth* (pp. 122–129). MIT Press.
- Garrett, B., & Anderson, K. (2018). Drone methodologies: Taking flight in human and physical geography. *Transactions of the Institute of British Geographers*, 43, 341–359. <https://doi.org/10.1111/tran.12232>
- George, B. H., & Park, K. (2020). Flying high: A case study of the integration of drones into a landscape architecture curriculum. *Journal of Digital Landscape Architecture*, 5, 246–253.
- Hauser, K. (2007). Revenants in the landscape: The discoveries of aerial photography. In *Shadow sites: Photography, archaeology, and the British landscape 1927–1955*. Oxford Academic. Retrieved October 20, 2022, from <https://doi.org/10.1093/oso/9780199206322.003.0009>
- Ihde, D. (2016). *Husserl's missing technologies*. Fordham University Press.
- Ingold, T. (2022). *Imagining for real. Essays on creation, attention and correspondence*. Routledge.
- Ipsos UK. (2022, June). *Future flight challenge—Mini public dialogue* (Eds., J. G. Camilleri, M. Mackie, R. Patel, & M. Reynolds).
- Jensen, O. B. (2020). Thinking with the drone—Visual lessons in aerial and volumetric thinking. *Visual Studies*. <https://doi.org/10.1080/1472586X.2020.1840085>
- Kaplan, C. (2020). Atmospheric politics: Protest drones and the ambiguity of airspace. *Digital War*, 1, 50–57. <https://doi.org/10.1057/s42984-020-00005-y>
- Kikuchi, N., Fukuda, T., & Yabuki, N. (2022). Future landscape visualisation using a city digital twin: Integration of augmented reality and drones with implementation of 3D model-based occlusion handling. *Journal of Computational Design and Engineering*, 9(2), 837–856. <https://doi.org/10.1093/jcde/qwac032>
- Kleinschroth, F., Banda, K., Zimba, H., Dondeyne, S., Nyambe, I., Spratley, S., & Winton, R. S. (2022). Drone imagery to create a common understanding of landscapes. *Landscape and Urban Planning*, 228, 104571. <https://doi.org/10.1016/j.landurbplan.2022.104571>
- Kullmann, K. (2018). The drone's eye: Applications and implications for landscape architecture. *Landscape Research*, 43(7), 906–921. <https://doi.org/10.1080/01426397.2017.1386777>
- Latour, B. (2005). *Reassembling the social*. Oxford University Press.
- Latour, B., & Schultz, N. (2022). *Notat om den nye økologisk klasse*. Hans Retzels Forlag. [Note on the new ecological class].
- Levitas, R. (2013). *Utopia as method. The imaginary reconstitution of society*. Palgrave Macmillan.
- Lun, L., Silva, E. A., Wu, C., & Wang, H. (2017). A machine learning-based method for the large-scale evaluation of the qualities of the urban environment. *Computers, Environment and Urban Systems*, 65, 113–125. <https://doi.org/10.1016/j.compenvurbsys.2017.06.003>
- Luo, J., Zhao, T., Cao, L., & Biljecki, F. (2022). Semantic Riverscapes: Perception and evaluation of linear landscapes from oblique imagery using computer vision. *Landscape and Urban Planning*, 228, 104569.
- M'Closkey, K., & VanDerSys, K. (2022). Behind-the-Scenes: Multispectral imagery and land cover classification. *Journal of Landscape Architecture*, 17(1), 22–37. <https://doi.org/10.1080/18626033.2022.2110417>
- Milligan, B. (2019). Making terrains: Surveying, drones and media ecology. *Journal of Landscape Architecture*, 14(2), 20–35. <https://doi.org/10.1080/18626033.2019.1673565>
- Mubi Brighenti, A., & Pavoni, A. (2020). Vertical vision and atmocultural navigation. Notes on emerging urban scopic regimes. *Visual Studies*, 35(5), 430. <https://doi.org/10.1080/1472586X.2020.1840089>
- Munck Petersen, R. (2021). Drone affect: Folded points of view as a co-affection method for empathy and care. *Emotion, Space and Society*, 41, 100842. <https://doi.org/10.1016/j.emospa.2021.100842>
- Munck Petersen, R., Jerram, S., & Hewitt, M. (2018). The Rising Gale Affect event film. https://static-curis.ku.dk/portal/files/215141054/FINAL_Rising_Gale_Affect_event_film
- Qiu, W., Li, W., Liu, X., & Huang, X. (2021). Subjectively measured streetscape perceptions to inform urban design strategies for Shanghai. *ISPRS International*

- Journal of Geo-Information*, 10, 493. <https://doi.org/10.3390/jgi10080493>
- Roumpani, F. (2022). Procedural cities as active simulators for planning. *Urban Planning*, 7(2), 321–329. <https://doi.org/10.17645/up.v7i2.5209>
- Schrotter, G., & Hürzeler, C. (2020). The digital twin of the city of Zurich for urban planning. *PFG*, 88, 99–112. <https://doi.org/10.1007/s41064-020-00092-2>
- Szweszyński, B. (2020). The grammar of action in the critical zone. In B. Latour & P. Weigel (Eds.), *Critical zones. The science and politics of landing on Earth* (pp. 344–348). MIT Press.
- Thompson, I. H. (2012). Ten tenets and six questions for landscape urbanism. *Landscape Research*, 37(1), 7–26. <https://doi.org/10.1080/01426397.2011.632081>
- Urry, J. (2016). *What is the future?* Polity Press.
- Waldheim, C. (1999). Aerial representation and the recovery of landscape. In J. Corner (Ed.), *Recovering landscape: Essays in contemporary landscape architecture*. Princeton Architec.
- Waldheim, C. (2016). Urban Crisis and the Origins of Landscape. In *Landscape as Urbanism: A General Theory* (pp. 88–104). Princeton University Press. <https://doi.org/10.2307/j.ctvcszzn2.10>
- Weller, R. (2008). Landscape (Sub)Urbanism in Theory and Practice. *Landscape Journal*, 27(2), 247–267. <http://www.jstor.org/stable/43332451>
- Wright, F. L. (1932). *The Disappearing City*. New York: W.F. Payson.
- Yin, L., & Wang, Z. (2016). Measuring visual enclosure for street walkability: Using machine learning algorithms and Google Street View imagery. *Applied Geography*, 76, 147–153. ISSN 0143–6228. <https://doi.org/10.1016/j.apgeog.2016.09.024>



Vocabularies of Drone Sensing

7

Anna Jackman

Introduction

As we increasingly live in the midst of the drone, it is asserted that we have entered a ‘drone age’ or ‘zeitgeist’ (Coley & Lockwood, 2016; Rothstein, 2015). Following the emergence of a now-established literature on the ‘dronification’ of contemporary warfare (see for example Gregory, 2011; Parks & Kaplan, 2017; Williams, 2011), scholars have turned attention to the drone’s growing deployment beyond the battlefield in increasingly diverse applications ‘at home’ (Kaplan & Miller, 2019, p. 419). While cognisant that the drone’s ‘domestication’ remains ‘born of militarized technologies and ways of knowing’ (Schnepf, 2019, p. 749), in recognition that the drone ‘ecosystem’ comprises diverse platforms (Jackman, 2019), scholars have critically traced the drone’s ‘ascendancy’ (Jumbert & Sandvik, 2017, p. 1) in and through varied contexts, such as policing, commercial applications and conservation (see for example Klauser, 2021; Richardson, 2018; Fish & Richardson, 2022). In pursuing attention to a growing range of drone applications scholars have sought not to conflate the politics of the drone’s differential employment, but rather to build a wide-reaching ‘critical project’ of entan-

glement, through the telling of diverse ‘drone stories’ (Jablonowski, 2015, p. 13).

Drone vision has emerged as a central theme within the growing body of interdisciplinary literature on the drone. Building upon work interrogating the military drone’s scopic regime (Gregory, 2011, p. 190; Grayson & Mawdsley, 2019), scholars have turned attention to the more-than-military drone’s visual capacities, examining the drone as a ‘powerful ethnographic tool’ rendering visible ‘otherwise hidden perspectives’ (Case et al., 2017, p. 75). Here the drone has been approached and explored as an ‘eye in the sky’ entering and opening optic terrains, as well as a frame to be adorned with a range of sensors enabling distinct perspectives and evoking ‘unique sensual amalgamations’ (Garrett & McCosker, 2017, p. 14; Fish et al., 2017; Klauser & Pedrozo, 2015; Jackman, 2017). At the same time, scholars across the social sciences have turned to the conceptual lens of ‘volume’ to (re) consider space in three- rather than two-dimensional terms (Elden, 2013; Adey, 2013; Jackman & Squire, 2021). Thinking volumetrically within and across aerial heights and ocean and subterranean depths, it is asserted, opens us to consider the ‘social, political, and cultural reverberations’ of ‘processes and phenomena that deploy beyond the two-dimensional’ (Billé, 2017, n.p.).

Thinking at the intersection of this work and building upon emerging work approaching the

A. Jackman (✉)
Department of Geography & Environmental Science,
University of Reading, Berkshire, UK
e-mail: a.h.jackman@reading.ac.uk

drone both in and as volume (Jensen, 2020; Klauser, 2021; Jackman & Brickell, 2022), this chapter explores *drone sensing volumes* and the diverse visualities, practices and relations they compose and comprise. In order to do so, it turns to the example of drone sensing in the aftermath of nuclear disaster, understanding this as both a volumetric project through which to explore such concerns and a *sensing sensibility* that invites and urges further attention to the vocabularies deployed in critical accounts of droning and volume alike. While extant scholarship draws essential critical attention to conflict, control and calculation across diverse volumetric spaces, contexts and activities, there remains a notable focus on military and state-led intervention and action within such accounting. Thinking with work attentive to more diverse actors in (dronified airspace) volume, this chapter thus opens an account of drone sensing sensibility that seeks to resolve rather than perpetrate volumetric violence. In so doing, it urges further attention to, and an expansion of, the vocabularies we use to narrate and articulate drone volumes.

Seeing-Sensing Drone Volumes

The drone is understood first and foremost as a visual craft. As such, interdisciplinary drone research has centrally focused attention to drone vision. Scholars have attributed the more-than-military drone with ‘novel’ visibilities, reflecting on the camera-laden optic drone’s opening of ‘360-degree panoramic views’ and undertaking of ‘mobile’ manoeuvres (Klauser & Pedrozo, 2015; Serafinelli & O’Hagan, 2022, p. 11; Hildebrand, 2020). While work has situated and ‘historicized’ the drone within wider lineages of aerial imagery (O’Hagan & Serafinelli, 2022, p. 2; Kaplan, 2018), scholars have nonetheless interrogated the drone as a platform affording ‘new ways of seeing’ and ‘knowing the world’ (Jensen, 2020, p. 423). Here, they have drawn attention to both the drone’s enabling and capture of ‘distinct images’ and ‘unexpected’ and ‘revealing’ perspectives (Serafinelli & O’Hagan, 2022, p. 1; Fish et al., 2017), and the distinct embodied

and multi-sensory dimensions of drone flight (Agostinho et al., 2020; Jablonowski, 2020) (Fig. 7.1).

Further, in recognition that drones are at once seeing and sensing craft, scholars have turned attention to the ‘more-than-optic’ sensors adorning the drone’s frame (Jackman, 2017, n.p.). Sensors can be understood as digital technologies deployed in the ‘monitoring of environments’ and gathering of data designed for ‘actuating responses’ to and for a range of contexts and issues (Houston et al., 2019, p. 858). As Gabrys (2016, p. 3) writes of sensing as environmental practice, sensing is at once ‘computational, networked, frequently automated, and increasingly ubiquitous’. As such, the role of sensors as our often ‘invisible companions’ (Klimburg-Witjes et al., 2021, p. 23) is understood as increasingly significant, as sensing ‘at once requires and enacts delineations of similarity and difference, sorting and classification’ (Suchman, 2021, p. 21). Building upon the notion that sensing is ‘always a political act’ (Klimburg-Witjes et al., 2021, p. 24), it is asserted that to sense is always to ‘sense as’, namely sensing renders particular terrains, peoples, objects and phenomena visible and actionable (Suchman, 2021, p. 21; Ash, 2019). Returning to the context of drones, scholars have focused attention to the role of sensors in the operation of the military drone, asserting that ‘before it is a weapon, the drone is a sensor’ (Richardson, 2022, p. 3). In this vein, the enrolment of infrared sensors in the tracking of ‘heat-bearing’ bodies below has been poignantly understood as rendering targeted peoples into ‘indistinct human morphologies’ (Parks, 2014, p. 2514, p. 2519). Asserting that sensors play a central role in the ‘violent mediation’ of drone warfare, Richardson (2022, p. 1, p. 2, p. 4) argues that it is important to conceive of the drone as ‘media apparatus’, and to interrogate its sensor and ‘sense-making’ in the enabling of the ‘translation’ of person or object to target.

In thinking otherwise about the drone’s ‘sense-making’, scholars have turned attention to the drone’s iterations as more-than-military craft, deployed in increasingly diverse civil, commercial, and recreational applications (Bradley &



Fig. 7.1 Drone. (Credit: MIKI Yoshihito (2015). Source: <https://www.flickr.com/photos/mujitra/19631093571/> (Attribution 2.0 Generic CC BY 2.0))

Cerella, 2019; Jackman & Brickell, 2022). Therein, a range of sensors, including thermal, multispectral, hyperspectral and lidar, are outfitted to drones (PrecisionHawk, n.d.). It is argued that such sensors at once enable the rendering visible of distinct visual terrains (Garrett & McCosker, 2017), and mark an extension of ‘human sense of sight’ into ‘atmospheric and vertical domains’ (Fish, 2018: n.p). The ‘more-than-visual’ capacities (Garrett & McCosker, 2017, p. 16) of the sensor-laden drone are understood as significant, then, as they constitute a ‘new visuality’ exceeding the ‘centrality of the ocular’ (Zuev & Bratchford, 2020, p. 443; Williams, 2011).

In parallel, scholars across the social sciences and humanities are increasingly mobilising the concept of volume, one premised on the idea that space may be better understood in three- rather than two-dimensional terms, that is, not as a surface, but instead as space with complex heights and depths (Elden, 2013; Weizman, 2002; Billé, 2017; Bratchford & Zuev, 2020; Jackman &

Squire, 2021). In pushing back against ‘primarily two-dimensional’ or ‘flat’ conceptualisations (Jensen, 2020, p. 417), scholars have accounted for voluminous contexts and their complexities across aerial, watery and icy, underground and subterranean volumes alike (see for example Adey, 2013; Bruun, 2020; Peters & Steinberg, 2019; Slesinger, 2020; Squire & Dodds, 2020).

In this vein, scholars have brought to bear a specifically volumetric lens on the aerial technology and airspace of the drone. Here they have argued that drones constitute and afford both ‘multidirectional spatialities’ (Klauser, 2022b, p. 149) and the ‘redefining’ of our ‘relation to and perception of the earth’ (O’Hagan & Serafinelli, 2022, p. 12). In at once enabling ‘complex, visual representations rendering the three-dimensionality of the world comprehensible’ (Jensen, 2020, p. 426) and acting in volume, it is asserted that drones mark a ‘deterritorializing effect’, ‘cutting across geographical divisions and replacing them with flight paths, vectors, the machinic gaze, and new simulated territories’

(O'Hagan & Serafinelli, 2022, p. 12). In exploring the drone as it flies in and as volume, scholars have turned particular attention to the contexts of volumetric security and policing. Here, it is argued that the domestic drone's growing advent enacts a militarised and securitised 'enclosure' of atmospheric volume (Jensen, 2016). In this vein, Klauser (2022b, p. 148) turns attention to the 'elemental, affective, sensory, cognitive and practical' dimensions of drone policing as and in aerial volumes, demonstrating the drone's transformation of 'the aerial realm' as 'lived context, object and perspective of policing' (see also Davis, 2019; Wall, 2013).

While powerfully examining a range of volumetric contexts, such scholarship collectively predominantly focuses upon both military and state-led approaches to volume (Jackman & Squire, 2021), foregrounding questions of volumetric calculation, 'control, enclosure and exclusion' therein (Squire & Dodds, 2020, p. 4; see also McNeill, 2020). This has resulted in the formation of a 'rhetoric' of volume (Benwell, 2020, p. 93) that acts to privilege particular actors, spaces, practices and accounts of volume (Campbell, 2019). As such, calls have emerged for attention to both a 'more diverse array' of volumetric projects, 'experiences, imaginaries and practices' (Harris, 2015, p. 602), and the forging of a 'specifically domestic drone theory' (Bradley & Cerella, 2019, n.p) attentive to everyday volumes and the 'growing range of non-state actors multiply mobilising, experiencing, and subject to the drone' therein (Jackman & Brickell, 2022, p. 157; Jackman & Squire, 2021, Bratchford & Zuev, 2020).

In examination of the 'deployment of volumetric strategies' in contexts beyond the military and state, and in more embodied terms, scholars have turned attention to the passage of cavers in Venezuela, Cuba and Mexico, attending to both 'surveying and mapping underground voids' and 'karsts' qualities' as they are encountered and felt in volume (Pérez & Zurita, 2020, p. 1, p. 8, p. 2). Similarly, in bringing the work of Black and Indigenous scholars into dialogue with volumetric literature, Bier (2022, p. 672) examines the shipping container as an invitation to pursue

more 'varied conceptions, practices, and forms of dimensionality at work in the reproduction of volumetric space'. In so doing, Bier (2022, p. 674, p. 672) highlights the shipping container's 'invisible' role in the 'reproduction and management of volumes of people, goods and materials worldwide' while interrogating it as an 'embodiment of gridded space' at once dependent 'upon racialized labor and colonial extraction' and revealing of volume's ongoing 'entanglement with global injustice'. In this vein, drone scholars have too developed accounts that seek to foreground a greater diversity of actors, experiences and accounts of volume. Here, they have at once urged reflections of volume at the scale of everyday life and the drone's (uneven) affordances therein (Jackman & Squire, 2021; Jackman & Brickell, 2022), and sought to diversify the actors in accounts of volume, drawing particular attention to non-state actors—such as protesters—in the production of 'atmospheric politics, spaces, and temporalities' (Kaplan, 2020, p. 50; see also Zuev & Bratchford, 2020; Choi-Fitzpatrick, 2019). In attending to drone volumes as democratising (Choi-Fitzpatrick, 2019), they at once recognise drones as 'aero-visual techniques of power' (Klauser & Pedrozo, 2015, p. 290) while highlighting the ways 'volumetric vision' enables the 'subversion of the visibility of control while striving for the visibility of recognition' (Zuev & Bratchford, 2020, p. 442). Thus, building upon accounts urging us to think volume otherwise (Adey, 2013), this chapter moves on to consider different drone sensing sensibilities and vocabularies of volume alike in the context of drones as they sense nuclear volumes.

Drone Sensing Nuclear Volumes

In recognition that to think volumetrically with the drone is at once to 'counter' conceptions of, and exceed, the two-dimensional (Jensen, 2020, p. 417), this section turns to the example of drones as sensing technologies in the context of the aftermath of nuclear disaster. After all, alongside 'establishing the air' to 'novel understandings, experiences, and actions' (Klauser, 2022a),

so too do drones open the air to increasingly diverse applications, including those branded as drone applications ‘for good’ (Jumbert & Sandvik, 2017).¹ While acknowledging the drone’s legacies and ongoing entanglements with war and violence, this chapter explores one such application—the deployment of drones in the aftermath of nuclear disaster—as an invitation and opportunity to revisit and, to an extent, reimagine both visualities and vocabularies of volume.

Disasters reportedly impact over 200 million people per year and are associated with over \$150 billion in damage (Kucharczyk & Hugenholtz, 2021). As such, diverse stakeholders are increasingly exploring drones as ‘mobile’ ‘instruments’ (Adey, 2016, p. 40, p. 33) to aid in disaster response and management. Here, drones are associated with offering a ‘lower cost’ and easier use tool for the ‘capture of on-demand visuals’, as well as the ability to integrate a range of sensors, when compared to the traditional deployment of ‘standard spaceborne and airborne platforms’ (Kucharczyk & Hugenholtz, 2021; Daud et al., 2022, p. 31). Within the context of post-disaster response, drones equipped with optic cameras have been used for mapping (We Robotics, 2022). This has been accompanied by sensor-laden drones outfitted with both thermal and infra-red sensors used to ‘find people’ in

‘inaccessible areas’ or in low light or nightfall (Soesilo et al., 2016), and audio-sensors used to ‘identify sound source’ or the ‘position of a victim shouting for help’ (Banerjee, 2020, n.p.). Sensor-laden drones are thus demonstrative of the drone’s capacity to ‘generate’ and render visible diverse data and terrains (Leszczynski, 2019, p. 1150).

Turning to the context of nuclear power specifically, while nuclear energy currently constitutes around ‘30% of the world’s low-carbon energy’ via 440 global nuclear reactors (Alexis-Martin et al., 2021, p. 2), there remains an association between nuclear power and threat (Pinto et al., 2021). Here, the sites and legacies of nuclear disasters such as Chernobyl and Fukushima loom large, understood as the ‘most notable examples of post-nuclear accident landscapes’ (Alexis-Martin & Davies, 2017, p. 4). For example, in April 1986, the ‘testing of a new voltage regulator’ at the Chernobyl Nuclear Power Plant in Ukraine caused an explosion in the ‘No. 4 reactor’, resulting in the ‘most severe release of radioactive material in the history of civil nuclear power generation’ (Connor, 2021, n.p.). In addition to the immediate death of 2 workers and the death of a further 28 within the following weeks, the accident resulted in the evacuation of around 350,000 people and the emission of fallout covering ‘150,000 km² of Europe’ and causing wide-reaching contamination (Connor, 2021, n.p.; Alexis-Martin & Davies, 2017, p. 4). In the aftermath of the accident, an Exclusion Zone was implemented around the nuclear facility, at once spatially inscribing and demarcating this landscape of risk (Alexis-Martin & Davies, 2017). To this day, the Exclusion Zone remains ‘access-controlled’ in order to ‘mitigate dose exposure’ (Connor et al., 2020, p. 1). Yet, in addition to the controlled tourist tours therein (Rush-Cooper, 2020), Chernobyl’s volume remains ‘lived-in’, occupied and ‘filled’ with diverse non-humans (Adey, 2013, p. 54; Squire, 2020). While the longer term impacts of the ‘aftermath of radioactive exposure’ remain unclear, alongside being (somewhat) ‘reclaimed’ by a ‘diverse’ natural ‘ecosystem’ (Alexis-Martin et al., 2021, p. 8), so too is the Exclusion Zone

¹While we increasingly see the rise and branding of drones as platforms for ‘good’, scholars have expressed caution about the drone’s ‘remediation’, arguing that the drone’s ongoing entanglement with war and violence, and the potential for the reimagining and repurposing of the ‘good’ drone to ‘detoxify’ this violence, should be critically considered (Jumbert & Sandvik, 2017; O’Hagan & Serafinelli, 2022, p.4). Here, drone logic remains a pertinent concept. Andrejevic (2015, p.9; 2016, p.26) describes ‘drone logic’ as the ‘coalescing’ of ‘logics of remote sensing, networking, distributed ubiquity, mobility, and automation’. Drone logic, he continues, ‘extends the reach and scope of the senses’, acting to ‘saturate time/spaces monitored’ and enabling diverse forms of automated capture and response (Andrejevic, 2016, p.23). Drone logic is significant, both because it enables the drone’s ‘dedifferentiation’—namely the crossing back and forth between military and civilian contexts and applications, and because it promotes a ‘seemingly inevitable logic of algorithmic decision-making’ (Andrejevic. 2016, p. 26, p. 29).

home to a community of dogs (Turnbull, 2020), one we'll return to shortly.

While occurring on a 'smaller scale to Chernobyl', in March 2011 a significant disaster occurred at the Fukushima Daichi nuclear power plant in Japan (Alexis-Martin & Davies, 2017, p. 4). A magnitude 9.0 earthquake and 15 m high tsunami resulted in the destruction of the 'plants connection to the external power network', causing 'inadequate cooling', the rising of core temperatures, a series of 'explosions and the ejection of various radionuclides into the atmosphere from a number of reactors' (Connor et al., 2016, p. 5964). In the immediate aftermath, radiation spread across the 'eastern coast of Japan's main island of Honshū' (Kirby, 2022, p. 1). So too did the accident result in 'radioactive debris strewn over hundreds of square kilometres' and the evacuation of 'around 210,000 people within a 20-km radius of the epicentre' (Kirby, 2022, pp. 1–2; Alexis-Martin & Davies, 2017, p. 4). As with the events at Chernobyl, the 'disaster endured along diverse timelines', enacting both 'immense material destruction' and an enduring emotional toll on the lives of millions lamenting and fearing the invisible 'scourge of radiation' (Kirby, 2022, pp. 1–2).

In returning to think about the role of the drone in the context of the aftermath of nuclear disaster, nuclear geographies highlight that nuclear spaces are both 'produced and described through extrasensory interpretations of landscapes' (Alexis-Martin et al., 2021, p. 3). In so doing, they assert that given the 'invisible nature of ionising radiation', practices of 'monitoring and sensing' both render visible nuclear landscapes, while also acting to 'ascibe' space as 'nuclear, non-nuclear, or ambiguous' (Alexis-Martin & Davies, 2017, p. 3; Alexis-Martin et al., 2021, p. 3). In this vein, following the events at Fukushima, there has been a 'notable increase' in studies employing drones in radiation detection research (Connor et al., 2016, p. 5983). Here, drones have emerged as increasingly significant tools in the seeing, sensing and ascription of nuclear landscapes and terrains. Within and beyond the contexts of Chernobyl and Fukushima, a growing range of state and non-state actors

have deployed sensor-laden drones as post-disaster tools. Researchers have argued that drones are at once comparatively cheaper tools than the manned aircraft typically used to undertake radiation mapping, and that drones afford higher spatial resolution in light of their 'low operating altitudes', thus offering more 'fine-scale observations' as well as the ability to fly (repeatable) 'pre-defined way-pointed flight paths' (Connor, 2021, n.p; Connor et al., 2016, p. 5955). In addition, drones are lauded as enabling 'expendable' entry into 'complex terrain by air' (Pinto et al., 2021, p. 3), that is lessening the potential 'exposure of crew to harmful doses of ionising radiation' (Connor, 2021, n.p). While noting the resonance of this justification with the common refrain that military drones enable access to and the completion of 'dull, dirty and dangerous' spaces and tasks without placing their operator in harm's way, drones are also associated with a range of limitations. These include limitations in flight time, battery life and operational range, the requirement for 'regulator maintenance', payload carrying-capacity and issues around 'floor-level' access around 'bushes or other thick vegetation' (Pinto et al., 2021, p. 3; Connor et al., 2020).

That said, drones have remained useful sensing tools in the aftermath of nuclear disaster. Therein, researchers have employed drones in the areas surrounding the Chernobyl Nuclear Power Plant, using both fixed-wing and multi-rotor drones in the production of 'radiation maps' (Connor, 2021, n.p; Connor et al., 2020). In detailing such work, Connor (2021, n.p) notably describes 'peeping through spectral windows'. Here, he refers to a mapping process that includes a 'modified' version of the 'Spectral Windows' method deployed for 'manned aerial gamma surveys', and which involves the 'segregation of the recorded gamma spectrum into a number of discrete energy windows that correspond to particular isotopes' (Connor et al., 2020, p. 2). Here, the drone sensing acted to 'reveal variations in the radiation dose rate', namely a 'measure of the amount of radiation absorbed by people if they were present on the ground' (Connor, 2021, n.p).

More than Human Agencies

We might however ask, how could we reflect otherwise on the notion of ‘peeping through spectral windows’ (Connor, 2021, n.p.)? Writing of the electromagnetic spectrum, namely the ‘range of frequencies of electromagnetic radiation (energy transferred), which are categorized as radio waves, microwaves, infrared, visible light, ultraviolet, X-rays, and gamma waves’, scholars have argued that the spectrum can be understood at once as a ‘relational backbone’ and as ‘territory’ of and for the ‘devices and networks we build’ (Tawil-Souri, 2017, n.p.). The drone is of course a spectrum-reliant technology, at once dependent upon the spectrum to function, and vulnerable to it, as is evidenced by a growing range of drone counter-measures variously seeking to interrupt and disrupt the drone (Jackman, 2017). In this vein, scholars have urged us to approach the drone as an ‘assemblage of the vertical’, that is to decentre the drone as object and instead emplace it within a ‘socio-technical assemblage of sky and vertical space’ (Crampton, 2016, p. 137) comprised and composed of actors, both human and non-human. Here, human operator, sky, ground, drone and spectrum alike act in a ‘mutual reciprocity’ (Klauser, 2022b, p. 159).

This theme has also emerged within nuclear geographies which are, it is asserted, ‘always more-than-human’ (Alexis-Martin et al., 2021, p. 6). In addition to the recognition of sensing technologies such as Geiger counters which—through ‘seeing, interpreting and translating’—play an important role in ‘making spaces nuclear’ (Alexis-Martin & Davies, 2017, p. 4), nuclear geographies have also drawn attention to the punctuation of Chernobyl’s ‘iconic landscape of toxicity’ by diverse non-humans, from chemical contaminants to animals alike (Turnbull, 2020, p. 21). Here, Turnbull’s (2020) account of the dogs of Chernobyl is particularly pertinent. Turnbull (2020, p. 21) notes that in the aftermath of the Chernobyl accident, evacuees were ‘instructed to leave their pets behind on the premise they would return within a few days’. This promise was however ‘quickly revoked’ and

instead soviet soldiers were ‘sent to kill any remaining pets for fears they would spread radioactive contamination’ (Turnbull, 2020, p. 21). However, it is estimated that around 550 dogs, ‘likely descendants’ of those abandoned and ‘survivors of the cull’, continue to roam in the area (Turnbull, 2020, p. 21). While originally viewed as disease ‘vectors’ by the state, these dogs both receive care facilitated by a non-governmental organization and form relationships with checkpoint guards (Turnbull, 2020, p. 21). In this vein, Turnbull (2020, p. 21) argues that Chernobyl’s dogs raise questions of ‘non-human belonging in toxic landscapes’. He continues that paying attention to human–non-human relations in toxic landscapes enables different understandings of ‘how life, death and care are reconfigured amongst multispecies communities that dwell in anthropogenic ruins’ (Turnbull, 2020, p. 24).

Building upon this work we might reconsider the nuclear sensing drone as at once a ‘lively’ sensing device ‘detecting, capturing, recording and inscribing’ (Klimburg-Witjes et al., 2021, p. 27), and a non-human contributing to the reconfiguration of both understandings of radiation landscapes and the relations therein. Here, we can valuably consider the work of scholars who, in their accounts of (citizen) sensing projects, have drawn attention to the ‘intimate’ and multiple relations between humans, environments, animals and technical objects alike (Gabrys, 2016; see also Fish et al., 2017; Sumartojo et al., 2022). In this vein, while drones are commonly referred to as ‘disruptive’ technologies that ‘change the way things are done’, so too have scholars called for attention to the ways in which drones can both disrupt spaces, people and relations in their midst, and be disrupted by the very same (Jackman, 2022, p. 9). For example, drones are associated with a range of ‘disturbances’ and forms of ‘potential alarm’ to human and wildlife alike—from noise and stress to prompting concerns around privacy and security (Duffy et al., 2018, p. 16). Just as drones ‘reverberate’ in volume, so too do they resonate with diverse actors in different ways (Billé, 2017, n.p.; Jackman & Squire, 2021).

Further, drones can also be *disrupted* by the very same diversity of actors. From animals that attack, humans that hack and malware that spoofs, multiple agencies—both human and non-human—can disrupt the drone’s idealised functioning (Jackman, 2022, p. 9). In other words, drones both ‘bring with them their own sets of vulnerabilities’ (Fish et al., 2017, p. 78), and the environments in which they operate can be understood as ‘far from passive matter upon which human or nonhuman “sense” operates’, but rather as active in both their functioning and their evaluation and ‘values’ (Gabrys, 2016, p. 10). Returning to the nuclear sensing drone specifically, drones operating in nuclear volumes are subject to a range of ‘obstacles’ (Klauser, 2022b, p. 153) potentially limiting their usage and functionality, with one key issue being the weather. In the same way that forces in aerial volumes enable the drone’s novel manoeuvre, the elemental can act as much as a ‘barrier’ than as a ‘bridge’ (Fish et al., 2017, p. 78). Scholars deploying drones at the Chernobyl Nuclear Power Plant described being ‘at the mercy of the weather’ (Connor et al., 2020, p. 11). While drone operators have sought to mitigate this somewhat through sensor ‘workarounds’ (Houston et al., 2019, p. 844) such as ‘waterproofing the central electronics components’, it is asserted that drones remain particularly ‘sensitive to variations in localized wind velocities’, with variations therein potentially creating ‘inconsistencies in recorded data’ (Connor et al., 2020, p. 11). As Klauser (2022b, p. 153) reminds us in investigation of the deployment of drones as policing tools, the ‘discovery of the air’ always involves and engages a ‘set of elemental processes’ which can be variously enabling, interrupting and disruptive (see also Squire, 2016). In the case of the nuclear sensing drone, we can again explore disruption through attention to the relations between sensor, chemical and air. For example, while asserting that drones enable operation and visibility ‘within even some of the most extreme radiological environments on earth’ (Connor et al., 2020, p. 2), it remains that nuclear fallout is itself voluminous, intersecting with drone sensing in volume in particular ways. Writing of undertaking research

with a fixed-wing drone in the Chernobyl Exclusion Zone, Connor et al. (2020, p. 9) describe that while the mapping ‘detailed the dose-rate variation’ in some locations, a ‘high-intensity plume’ over the Red Forest ‘could not be presented in its entirety as its significant radiological fingerprint caused an overloading (saturation) of the electronics of the detector’. Here, the overwhelming quality of nuclear volume reminds us of the need to consider the ways in which sensors both shape and are ‘shaped by the environments in which they are placed’ and the phenomena they ‘(attempt to) render visible’ (Klimburg-Witjes et al., 2021, p. 24).

Building upon the work of Jennifer Gabrys, geographer James Ash (2019, p. 116) also urges further attention to ‘relations between technical objects themselves’. Here, Ash (2019, pp. 115–116) specifically provides the example of the ‘radio spectrum’, at once essential for enabling telecommunications while also disabling through ‘spectrum crunches’. In this vein, he argues that technical objects ‘both transform the environment and in turn transform what the environment can do’ (Ash, 2019, pp. 115–116). Nuclear sensing drones work in conjunction with the spectrum, wavelength connections, digital interfaces and signals alike to ‘apprehend, structure and act in their surroundings’, creating and ‘generative of spatiality’ (Sumartojo et al., 2022, p. 5), while also being shaped by these and wider surroundings. Nuclear sensing drones are thus first and foremost ‘relational’ and ‘contingent’ (Sumartojo et al., 2022, p. 5) in their emergent visibilities, a technology that variously (re)shapes—and is (re)shaped—by diverse human and non-human actors and environments.

Vocabularies of (Drone Sensing) Volume

In drawing this chapter to a close, in addition to urging further consideration of the drone as a seeing-sensing craft comprising and comprised by a range of volumetric relations, so too does drone sensing in the aftermath of nuclear disaster invite, and even necessitate, us to reflect further

on the very vocabularies we deploy in discussion of (drone sensing) volumes. As we saw in the ‘seeing-sensing drone volumes’ section, existing accounts of volume predominantly foreground both military and state actors and questions of conflict, calculation, and control. While it remains that such concerns resonate with discussions of drones and nuclear power facilities—wherein the repeated unanticipated presence of drones in proximity to sensitive critical infrastructure has provoked a range of security concerns (see for example Abbott et al., 2016; Jackman, 2019; Layton, 2022)—it remains that the nuclear sensing drones we’ve examined in this chapter act at once to circumvent, challenge and reimagine securitised and calculative notions of instrumentalization in and of volume, as well as the kinds of relations underpinning them. As we have seen, nuclear sensing drones seek to know and render visible the chemical composition of airspace volumes with the aim of mapping radiation in order to limit potential exposure to radiation and its associated harms. Thus, in its mobilisation as a radiation sensing tool, the drone exceeds violent instrumentalisation—its ‘rendering knowable’ of voluminous ‘unknowability’ (Forman, 2020, p. 160, p. 145) instead enabling different kinds of ‘intervention’ and relations in volume (Jackman & Squire, 2021, p. 493).

I make this point not to overlook the ‘egis of military need’ through which drones emerged and remain entangled (Dodge, 2018), or to eschew a consideration of sensing environments as ‘techno-geographical’—that is to recognise that sensing technologies are not ‘simply laid or spread on top of a pre-existing nontechnical space’ (Ash, 2019, p. 115; see also Gabrys, 2016),² but rather to urge an openness and curiosity to—and vocabulary for—drone sensing volumes that seek to *resolve* rather than *conduct*

²As nuclear geographies have stressed, nuclear ‘spaces and legacies’ remain ‘geographically unevenly distributed’ (Alexis-Martin et al., 2021, p. 2), bound to and performative of ‘uneven cartographies of contamination’ (Turnbull, 2020, p. 24).

violence. By highlighting and unpacking more diverse drone sensing practices, we can be open to more multiple and care-full drone visuals and sensing sensibilities. While cognisant that the ‘meaning and consequences of being sensed’ of course vary (Klimburg-Witjes et al., 2021, p. 27), in this openness we can further explore the ways drone sensors shape ‘the construction and experience of space’ (Ash, 2019, p. 115) in ‘contradictory’ ways (Fish & Richardson, 2022, p. 3), while deepening our reflections on what it means to write, narrate and account for volume more widely. In other words, we can consider this openness as contributing to a wider ‘speculative’ project of exploring what and how sensors and environments ‘concrese’, that is grow together (Gabrys, 2016, p. 11).

As Adey (2010, p. 207) reminds us, airspaces remain ‘uneven domains and doings’. Yet while the drone and its underpinning logics continue to enable violence and amplify surveillance and control, so too is the drone a malleable tool (Jackman, 2019; Kaplan, 2020). Its sensing capacities can be ‘appropriated to socially productive ends’ (Garrett & Anderson, 2018), enabling diverse forms of ‘visibility’ of and for ‘recognition’ (Zuev & Bratchford, 2020, p. 442). Drone sensing can, then, enable and enact sensing in volume and ‘sensory’ volumes that reveal another ‘geopolitics that might be possible’ (Ingram, 2012, p. 124). In other words, while remaining attentive to drone sensing ‘in relation to the milieu of which it is a part’ (Ash, 2019, p. 115), so too can we understand drone sensing as ‘adding to’ and ‘extending’ our ‘repertoire of sense-abilities’ (Fish, 2018: n.p) in ways that exceed logics and narratives of calculation and control. By thinking of the drone as ‘unfinished’ technology whose malleability, elasticity and scope for ‘improvisation’ might open and offer alternatives for ‘imagining what might come next’ (Sumartojo & Lugli, 2021, p. 13), we open ourselves and our vocabularies of volume alike, to more multiple and diverse accounting and accounts of drone visuals and volumes.

Conclusions

Bringing into dialogue drone scholarship and the wider mobilisation of the concept of volume, this chapter explored the drone as a technology acting in, capturing and sensing, and comprising volume. After all, as Garrett and Anderson (2018, p. 356) write, drones ‘reveal new directions informing the volumetric turn’. Offering contribution to discussions around both the ‘characteristics of drone visuals’ (Serafinelli & O’Hagan, 2022, p. 2) and the role of sensors in the formation of a ‘new kind of techno-geography’ (Ash, 2019, p. 115), this chapter turned attention to drone sensing volumes and the diverse visibilities, practices and relations they compose and comprise. In so doing, it recognised both that drones ‘add to the repertoire of sense-abilities’ in interesting ways (Fish, 2018, n.p), and that to sense with a drone is to ‘feel worlds and make particular problems matter’ (Gabrys, 2016, p. 274). Through the example of drone sensing in the aftermath of nuclear disaster, it unpacked drone sensing as both a volumetric project and a sensing sensibility inviting and urging further attention to the vocabularies deployed in our accounts of droning and volume alike.

Following the assertion that drones ‘do more than see the world’ (Richardson, 2020, n.p), it interrogated the example of drone-enabled radiation detection to highlight both the diversity of actors, ‘air-bound expectations and practices’ that can arise in and from varied drone deployments (Klauser, 2022b, p. 148), and the multiplicity of human and non-human relations therein. Further, through the example of drone sensing nuclear volumes, it demonstrated that more nuanced attention is needed to the notions and narratives of instruments and instrumentalization in volume. After all, in its rendering visible of invisible chemical and sensory terrains, drone sensing in the context of nuclear aftermath seeks to resolve rather than to perpetrate volumetric violence. As such, it prompts and invites us to further explore and tell more diverse ‘stories’ (Jablonowski, 2015) of both *drone sensing* and *drone sensing sensibilities* alike.

Acknowledgements This work was facilitated by the Economic and Social Research Council funded project ‘Diversifying Drone Stories’ (ES/W001977/1), led by Dr Anna Jackman.

References

- Abbott, C., Clarke, M., Hathorn, S., & Hickie, S. (2016, January 11). Hostile drones: The hostile use of drones by non-state actors against British targets. *Open Briefing for Remote Control Project*. Retrieved from https://www.files.ethz.ch/isn/195685/Hostile%20use%20of%20drones%20report_open%20briefing_0.pdf
- Adey, P. (2010). *Aerial Life*. Oxford: Wiley Blackwell.
- Adey, P. (2013). Securing the volume/volumen: Comments on Stuart Elden’s Plenary paper ‘Secure the volume’. *Political Geography*, 34, 52–54.
- Adey, P. (2016). Emergency mobilities. *Mobilities*, 11(1), 32–48.
- Agostinho, D., Maurer, K., & Veel, K. (2020). Introduction to the sensorial experience of the drone. *The Senses and Society*, 15(3), 251–258.
- Alexis-Martin, B., & Davies, T. (2017). Towards nuclear geographies: Zones, bodies, and communities. *Geography Compass*, 11, e12325.
- Alexis-Martin, B., Turnbull, J., Bennett, L., Bolton, M., Davies, T., Dunlop, G., Hawkins, D., Hogue, R. H., Holloway, P., Malin, S. A., Mangioni, T. L., Mayoux, C., McClelland, G., Meyer, T., Slavik, E. O., & Ross, L. (2021). Nuclear geographies and nuclear issues. In D. Richardson, N. Castree, M. F. Goodchild, A. Kobayashi, W. Liu, & R. A. Marston (Eds.), *The international encyclopaedia of geography*. John Wiley & Sons, Ltd.
- Andrejevic, M. (2015). FCJ-187 The droning of experience. *The Fibreculture Journal*, 25, 202–217. <https://doi.org/10.15307/fcj.25.187.201>
- Andrejevic, M. (2016). Theorizing drones and droning theory. In A. Završnik (Ed.), *Drones and unmanned aerial systems: Legal and social implications for security and surveillance* (pp. 21–43). Springer International Publishing.
- Ash, J. (2019). For a techno-geography of sensing objects. *Dialogues in Human Geography*, 9(1), 115–117.
- Banerjee, A. (2020, January 29). Drone-mounted microphones could help rescuers find disaster survivors more quickly. *We Robotics*. Retrieved from <https://blog.werobotics.org/2020/01/29/drone-mounted-microphones-could-help-rescuers-find-disaster-survivors-more-quickly/>
- Benwell, M. C. (2020). Going underground: Banal nationalism and subterranean elements in Argentina’s Falklands/Malvinas Claim. *Geopolitics*, 25(1), 88–108.
- Bier, J. (2022). Depth beyond 3D: The decolonial dimensions of volume. *Progress in Human Geography*, 46(2), 672–688.

- Billé, F. (2017). Introduction: Speaking volumes. *Society for Cultural Anthropology.*. <https://culanth.org/fieldsights/introduction-speaking-volumes>
- Bradley, A., Cerella, A. (2019, July 30). Droneland: Towards a domestic drone theory. *Security Dialogue*. Retrieved from <https://blogs.prio.org/SecurityDialogue/2019/07/droneland-towards-a-domestic-drone-theory/>
- Bratford, G., & Zuev, D. (2020). Aerial visibilities: Towards a visual sociology of the sky. *Visual Studies*, 35(5), 402–416.
- Bruun, J. (2020). Invading the whiteness: Science, (sub) terrain, and US militarisation of the Greenland Ice Sheet. *Geopolitics*, 25, 167–188.
- Campbell, E. (2019). Three-dimensional security: Layers, spheres, volumes, milieus. *Political Geography*, 69, 10–21.
- Case, O., Fish, A., & Garrett, B. L. (2017). Drone sense, 73–76. Retrieved from https://www.researchgate.net/publication/320827275_Drone_Sense
- Choi-Fitzpatrick, A. (2019). *The good drone: How social movements democratize surveillance*. MIT Press. Retrieved from <https://thegooddrone.pubpub.org/>
- Coley, R., & Lockwood, D. (2016). As above, so below: Triangulating drone culture. *Culture Machine*, 16. <https://culturemachine.net/vol-16-drone-cultures/as-above-so-below/>
- Connor, D. (2021, February 2021). Harnessing drone technology to map radiation around Chornobyl. *Research Features*. Retrieved from <https://researchfeatures.com/harnessing-drone-technology-map-radiation-around-chernobyl/>
- Connor, D., Martin, P. G., & Scott, T. B. (2016). Airborne radiation mapping: Overview and application of current and future aerial systems. *International Journal of Remote Sensing*, 37(24), 5953–5987.
- Connor, D. T., Wood, K., Martin, P. G., Goren, S., Megson-Smith, D., Verbelen, Y., Chyzhevskyi, I., Kirieiev, S., Smith, N. T., Richardson, T., & Scott, T. B. (2020). Radiological mapping of post-disaster nuclear environments using fixed-wing unmanned aerial systems: A study from Chernobyl. *Frontiers in Robotics and AI*, 6, 149.
- Crampton, J. W. (2016). Assemblage of the vertical: Commercial drones and algorithmic life. *Geographica Helvetica*, 71, 137–146.
- Daud, S. M. S. M., Yusof, M. Y. P. M. Y., Heo, C. C., Khoo, L. S., Singh, M. K. C., Mahmood, M. S., & Nawawi, H. (2022). Applications of drone in disaster management: A scoping review. *Science & Justice*, 62(1), 30–42.
- Davis, O. (2019). Theorizing the advent of weaponized drones as techniques of domestic paramilitary policing. *Security Dialogue*, 50(4), 344–360.
- Dodge, M. (2018). Mapping II: News media mapping, new mediated geovisualities, mapping and verticality. *Progress in Human Geography*, 42, 949–958.
- Duffy, J. P., Cunliffe, A. M., DeBell, L., Sandbrook, C., Wich, S. A., Shutler, J. D., Myers-Smith, I. H., Varela, M. R., & Anderson, K. (2018). Location, location, location: Considerations when using lightweight drones in challenging environments. *Remote Sensing in Ecology and Conservation*, 4, 7–19.
- Elden, S. (2013). Secure the volume: Vertical geopolitics and the depth of power. *Political Geography*, 34, 35–51.
- Fish, A. (2018). Drone capitalism. *Anthro(dendum)*. <https://anthrodendum.org/2018/06/23/drone-capitalism/>
- Fish, A., & Richardson, M. (2022). Drone power: Conservation, humanitarianism, policing and war. *Theory, Culture & Society*, 39(3), 3–26.
- Fish, A., Garrett, B. L., & Case, O. (2017). Drones caught in the net. *Imaginations*, 8(2), 74–79. <https://doi.org/10.17742/IMAGE.LD.8.2.8>
- Forman, P. J. (2020). Security and the subsurface: Natural gas and the visualisation of possibility spaces. *Geopolitics*, 25(1), 143–166.
- Gabrys, J. (2016). *Program earth: Environmental sensing technology and the making of a computational planet*. University of Minnesota Press.
- Garrett, B., & Anderson, A. (2018). Drone methodologies: Taking flight in human and physical geography. *Transactions of the Institute of British Geographers*, 43, 341–359.
- Garrett, B. L., & McCosker, A. (2017). Non-human sensing: New methodologies for the drone assemblage. In E. Gómez Cruz, S. Sumartojo, & S. Pink (Eds.), *Refiguring techniques in digital visual research* (pp. 13–23). Palgrave Macmillan.
- Grayson, K., & Mawdsley, J. (2019). Scopic regimes and the visual turn in international relations: Seeing world politics through the drone. *European Journal of International Relations*, 25(2), 431–457.
- Gregory, D. (2011). From a view to a kill: Drones and late modern war. *Theory, Culture & Society*, 28(7–8), 188–215.
- Harris, A. (2015). Vertical urbanisms: Opening up geographies of the three-dimensional city. *Progress in Human Geography*, 39(5), 601–620.
- Hildebrand, J. M. (2020). Drone-topia as method. *Mobilities*, 15(1), 25–38. <https://doi.org/10.1080/17450101.2019.1663079>
- Houston, L., Gabrys, J., & Pritchard, H. (2019). Breakdown in the smart city: Exploring workarounds with urban-sensing practices and technologies. *Science, Technology & Human Values*, 44(5), 843–870.
- Ingram, A. (2012). Experimental geopolitics: Wafaq Bilal's domestic tension. *The Geographical Journal*, 178(2), 123–133.
- Jablonowski, M. (2015). Drone it yourself! On the decentring of 'drone stories'. *Culture Machine*, 16, 1–15.
- Jablonowski, M. (2020). Beyond drone vision: The embodied telepresence of first-person view drone flight. *The Senses & Society*, 15(3), 344–358.
- Jackman, A. (2017). Sensing. *Society for Cultural Anthropology*. <https://culanth.org/fieldsights/sensing>
- Jackman, A. (2019). Consumer drone evolutions: Trends, spaces, temporalities, threats. *Defense & Security Analysis*, 35(4), 362–383.

- Jackman, A. (2022). Domestic drones. *Political Geography*, 97, 102653. <https://doi.org/10.1016/j.polgeo.2022.102653>
- Jackman, A., & Brickell, K. (2022). 'Everyday droning': Towards a feminist geopolitics of the drone-home. *Progress in Human Geography*, 46(1), 156–178.
- Jackman, A., & Squire, R. (2021). Forging volumetric methods. *Area*, 53, 492–500.
- Jensen, O. B. (2016). New 'Foucauldian Boomerangs': Drones and urban surveillance. *Surveillance & Society*, 14(1), 20–33.
- Jensen, O. B. (2020). Thinking with the drone—Visual lessons in aerial and volumetric thinking. *Visual Studies*, 35(5), 417–428.
- Jumbert, M. G., & Sandvik, K. B. (2017). Introduction: What does it take to be good? In K. B. Sandvik & M. G. Jumbert (Eds.), *The good drone* (pp. 1–25). Routledge.
- Kaplan, C. (2018). *Aerial aftermaths: Wartime from above*. Duke University Press.
- Kaplan, C. (2020). Atmospheric politics: Protest drones and the ambiguity of airspace. *Digital War*, 1, 50–57.
- Kaplan, C., & Miller, A. (2019). Drones and 'atmospheric policing': From US Border enforcement to the LAPD. *Public Culture*, 31(3), 419–445.
- Kirby, P. W. (2022). Radiant scars: Fallout, trauma, ghosts, and (re)worlding in Fukushima. *Geografiska Annaler: Series B, Human Geography*, <https://doi.org/10.1080/04353684.2022.2101136>
- Klauser, K. (2021). Policing with the drone: Towards an aerial geopolitics of security. *Security Dialogue*, 53(2), 148–163. <https://doi.org/10.1177/0967010621992661>
- Klauser, F. (2022a). Commercial drones and the territorialisation of the air: Towards an aero-volumetric understanding of power and territory. In A. M. Brightenti & M. Karrholm (Eds.), *Territories, environments, politics: Explorations in territoriology* (pp. 55–69). Routledge.
- Klauser, F. (2022b). Policing with the drone: Towards an aerial geopolitics of security. *Security Dialogue*, 53(2), 148–163.
- Klauser, F., & Pedrozo, S. (2015). Power and space in the drone age: A literature review and politico-geographical research agenda. *Geographica Helvetica*, 70, 285–293.
- Klimburg-Witjes, N., Poechhacker, N., & Bowker, G. C. (2021). Sensing in/securities: An introduction. In N. Klimburg-Witjes, N. Poechhacker, & G. C. Bowker (Eds.), *Sensing in/securities: Sensors as transnational security infrastructures* (pp. 23–49). Mattering Press.
- Kucharczyk, M., & Hugenholtz, C. (2021, August 11). Disaster-mapping drones often neglect deadliest, costliest events and hardest-hit areas. *The Conversation*. Retrieved from <https://theconversation.com/disaster-mapping-drones-often-neglect-deadliest-costliest-events-and-hardest-hit-areas-165412>
- Layton, J. (2022, October 31). 'Swarm' of drones spotted flying above UK nuclear plant. *Metro*. Retrieved from <https://metro.co.uk/2022/10/31/swarm-of-drones-spotted-flying-above-uk-nuclear-plant-17666304/>
- Leszczynski, A. (2019). Digital methods II: Digital-visual methods. *Progress in Human Geography*, 43(6), 1143–1152.
- McNeill, D. (2020). The volumetric city. *Progress in Human Geography*, 44(5), 815–831.
- O'Hagan, L. A., & Serafinelli, E. (2022). Transhistoricizing the drone: A comparative visual social semiotic analysis of pigeon and domestic drone photography. *Photography and Culture*. <https://doi.org/10.1080/17514517.2022.2116899>
- Parks, L. (2014). Drones, infrared imagery, and body heat. *International Journal of Communication*, 8, 2518–2521.
- Parks, L., & Kaplan, C. (2017). Introduction. In L. Parks & C. Kaplan (Eds.), *Life in the age of drone warfare* (pp. 1–22). Duke University Press.
- Pérez, M. A., & Zurita, M. L. M. (2020). Underground exploration beyond state reach: Alternative volumetric territorial projects in Venezuela, Cuba, and Mexico. *Political Geography*, 79, 1–10.
- Peters, K., & Steinberg, P. (2019). The ocean in excess: Towards a more-than-wet ontology. *Dialogues in Human Geography*, 9, 293–307.
- Pinto, L. R., Vale, A., Brouwer, Y., Borbhina, J., Corisco, J., Ventura, R., Silva, A. M., Mourato, A., Marques, G., Romanets, Y., Sargent, S., & Goncalves, B. (2021). Radiological scouting, monitoring and inspection using drones. *Sensors*, 21, 3143. <https://doi.org/10.3390/s21093143>
- PrecisionHawk. (n.d.). Beyond the edge: How advanced drones, sensors, and flight operations are redefining the limits of remote sensing. Retrieved from <https://www.precisionhawk.com/sensors/advanced-sensors-and-data-collection/>
- Richardson, M. (2018). Drone capitalism. *Transformations*, 31, 79–98.
- Richardson, M. (2020, September 8). Eyes on the world—Drones change our point of view and our truths. *UNSW Sydney*. Retrieved from <https://www.unsw.edu.au/news/2020/09/eyes-on-the-world%2D%2Ddrones-change-our-point-of-view-and-our-truth>
- Richardson, M. (2022). Drone trauma: Violent mediation and remote warfare. *Media, Culture & Society*, 1–10.
- Rothstein, A. (2015). *Drone*. Bloomsbury Publishing Inc.
- Rush-Cooper, N. (2020). Nuclear landscape: Tourism, embodiment and exposure in the Chernobyl Zone. *Cultural geographies*, 27(2), 217–235.
- Schnepf, J. D. (2019). Unsettling aerial surveillance: Surveillance studies after standing rock. *Surveillance and Society*, 17(5), 747–751.
- Serafinelli, E., O'Hagan, L.A. (2022). Drone views: a multimodal ethnographic perspective. *Visual Communication*, 0(0), 1–21.
- Slesinger, I. (2020). A cartography of the unknowable: Technology, territory and subterranean agencies in Israel's management of the Gaza tunnels. *Geopolitics*, 25, 17–42.
- Soesilo, D., Meier, P., Lessard-Fontaine, A., Du Plessis, J., Stuhlberger, C., & Fabbroni, V. (2016). Drones in humanitarian action a guide to the use of airborne sys-

- tems in humanitarian crises. Retrieved from <https://blog.werobotics.org/wp-content/uploads/2016/12/drones-in-humanitarian-actionemail.pdf>
- Squire, R. (2016). Rock, water, air and fire: Foregrounding the elements in the Gibraltar-Spain dispute. *Environment and Planning D: Society and Space*, 34(3), 545–563.
- Squire, R. (2020). Companions, zappers, and invaders: The animal geopolitics of Sealab I, II, and III (1964–1969). *Political Geography*, 82, 1964–1969.
- Squire, R., & Dodds, K. (2020). Introduction to the special issue: Subterranean geopolitics. *Geopolitics*, 25(1), 4–16.
- Suchman, L. (2021). Foreword. In N. Klimburg-Witjes, N. Poehacker, & G. C. Bowker (Eds.), *Sensing in/securities: Sensors as transnational security infrastructures* (pp. 19–22). Mattering Press.
- Sumartojo, S., & Lugli, D. (2021). Lively robots: Robotic technologies in COVID-19. *Social & Cultural Geography*. <https://doi.org/10.1080/14649365.2021.1921245>
- Sumartojo, A., Lundberg, R., Kulic, D., Tian, L., Carreno-Medrano, P., Mintrom, M., Lugli, D., & Allen, A. (2022). The robotic production of spatiality: Predictability, partitioning, and connection. *Transactions of the Institute of British Geographers*, 00, 1–13.
- Tawil-Souri, H. (2017). Spectrum. Speaking volumes. *Society for Cultural Anthropology*. <https://culanth.org/fieldsights/spectrum>
- Turnbull, J. (2020). Checkpoint dogs: Photovoicing canine companionship in the Chernobyl Exclusion Zone. *Anthropology Today*, 36(6), 21–24.
- Wall, T. (2013). Unmanning the police manhunt: Vertical security as pacification. *Socialist Studies*, 9(2), 32–56.
- We Robotics. (2022). WATCH: Drone applications for disaster management. Retrieved from <https://blog.flyinglabs.org/2022/07/13/watch-drone-applications-for-disaster-management/>
- Weizman, E. (2002, April 23). 1. Introduction to the politics of verticality. *Open Democracy*. Retrieved from https://www.opendemocracy.net/en/article_801jsp/
- Williams, A. J. (2011). Enabling persistent presence? Performing the embodied geopolitics of the unmanned aerial vehicle assemblage. *Political Geography*, 30, 381–390.
- Zuev, D., & Bratchford, G. (2020). The citizen drone: Protest, sousveillance and droneviewing. *Visual Studies*, 35(5), 442–456.



Viewing from Where? Satellite Imaging and the Politics of Space Technology: Unpacking Depravity's Rainbow

8

Lewis Bush

In this text I consider the intersection of technology, politics and power, through the linked technologies of rocketry and optical mapping satellites. Drawing on Science and Technology Studies, I argue for the importance of artists and researchers thinking critically about the origins of the technologies they research and use, conducting a technological genealogy of sorts which aims to trace back through the history of these things, and think about the ways that circumstances of their creation might continue to influence their present. In my own case, I examine the ways that contemporary rocketry and satellite mapping were shaped by anti-democratic, anti-humanity impulses, the former in the context of the Second World War and the Holocaust, and the latter in the early days of the Cold War. Starting with a discussion about definitions and politics of technology, I move into a discussion of two long-term creative works, which examine the aforementioned technologies, and draw on them to think about the ways that military technologies repurposed for civilian, scientific purposes, still retain aspects of their original usage.

When accounts of the past are written, history is frequently stratified into convenient epochs, and the same is often true of the history of technology. Up until the mid-twentieth century most

historians seemed to place the emergence of ‘technology’ as a distinctly industrial event, which coincided with the rise of the steam engine and the mill. Technology was simply something machinic, mechanical. A thing like a lathe or a steam engine, designed by people to make or do other things, a definition echoing the ancient Greek root of the word, *techne*. Some thinkers, a notable early example was Lewis Mumford, took issue with this idea, and traced the advent of the machine far earlier, to at least the Middle Ages, expanding the idea of what might constitute a technology to include things like the first clocks (Mumford, 1934). Critically for Mumford, technologies were not just things that determined the shape of the world, they were themselves embodiments of human belief and spirituality.

Mumford’s way of thinking about technology is a threshold to delinking this word from the assumption of something material. His ideas allow us to expand technological analysis beyond those early clanking steam engines, beyond his medieval clocks even, and allow us to start thinking of technologies as methods of arrangement, or processes, as much as they are material, physical things, and from this to take a further step into thinking about how those arrangements both reflect and create political realities. The digital era has in turn helped to make the definition of technology certainly less stable, since technologies now are also increasingly abstract, things, if admittedly still basically physical in the sense of

L. Bush (✉)
Department of Photography, London College of Communication (LCC), London, UK
e-mail: lewis@lewisbush.com

the elements, electrons and magnetic fields which make digital technologies work, but in a far looser sense than their predecessors. But while the digital era might have altered our sense of what technologies tangibly are, it hasn't necessarily led to a more nuanced way of thinking about where they come from and what they do.

Digital technologies continually infiltrate into very intimate areas of life like dating, mental or reproductive health. At the same time as this proliferation, we see a corresponding growth in cases where these technologies are associated with corresponding upset, scandals and harms. Period tracking apps for example have emerged as a potential surveillance tool in the context of abortion bans in the United States, (Garamvolgyi, 2022) while the algorithmic engines behind dating apps have been repeatedly critiqued for a host of problems including misogyny and racism (McMullan, 2019). But despite this, it is still common for people to speak of technologies as things which are essentially transparent, neutral and lacking in political colouring. The harms that technologies routinely cause tend to be viewed as products of poor design and ill-thought-out choices. We rarely see these unwanted outcomes as things which are perhaps hardwired in some sense into the very technologies themselves, as things which were baked into them as a result of the circumstances of their creation, and which, to remove them, would require not only a redesign of the technology, but perhaps an entire reinvention of it.

These questions have been central to Science and Technology Studies for half a century. Langdon Winner for example noted two potential manifestations of the politics of technologies (Winner, 2009). For the first he noted that certain technologies simply lend themselves to pre-existing social orderings, to the entrenchment of power of certain groups, often at the disadvantage of another. The political effects of these technologies are a consequence of their union with existing power structures, but the technologies themselves do not create those structures. As an example of this, the steam train had many unintended consequences that sometimes served (as well as sometimes shattering) the existing

order. One nineteenth-century aristocrat for example praised the train line passing through his estate, for the way it contained and concealed what would once have been unsightly lines of the bedraggled poor, passing along the towpath of the canal which the railway had replaced (Jennings, 1985).

But for the second manifestation of politics in the machine, Winner suggested that some technologies may be inherently political, in that their uses are inescapably good or bad. Rather than meshing with an existing structure, they shape and create new structures in a society, again to the detriment of some groups, and the enrichment of others. Nuclear power, Winner suggested, was an obvious example of this, because the profound dangers of the atom demanded the emergence of a new techno-military elite with the power to properly control it. There could be no atomic power without a corresponding social grouping, and so the technology brought with it an innate, authoritarian and centralising impulse which Winner suggested was distinctly different from the impulse that other, more decentralised forms of energy production, like renewable wind or solar power, might create (Fig. 8.1).

These political qualities are perhaps easiest to perceive in newer technologies, which is why I began with the example of personal health apps, and presumably why Winner choose nuclear power when he was writing about this problem forty years ago. Discerning the social shifts and political effects that technologies can create becomes far fogtier, and those effects paradoxically more magnified, in technologies which have been around for much longer. Once we have lived with something for fifty years, or a century, or a millennium, the idea of revisiting its invention seems almost impossible. To propose for example, that we should not just be transitioning from petrol to electric cars, but should instead perhaps be rethinking the entire basis of the private car, tends to draw doubtful looks, in part I suspect because so much has since been built on the choices made a century ago with regard to this technology that they cease to seem like choices at all.



Fig. 8.1 Brockenhaus, former Stasi eavesdropping installation. Brocken Mountains, Germany. Composite satellite image, from the series *Shadows of the State* (2014–2018)

But thinking about the history of old technologies before that point seems to me to be vital, because many technologies will never otherwise reach the threshold of such extreme harm that might cause us to reassess them and consider better, more equitable alternatives to them. The internal combustion engine for example is now coming under scrutiny but only at the stage where we may already be too late to avert the catastrophic planetary harms it has contributed to. In practice such a return seldom occurs on a practical level, but it can be a useful thought experiment to consider what other avenues a particular technology might have developed along had the circumstances of its development been different.

This project of thinking about the politics of the technologies is also important, I would suggest, to photographers and artists using technologies to make work which engages with technology

and power, as my own often does. In some cases it is also important depending on the media and technologies one uses to make ones work. To be a photographer and not have even a passing knowledge of the history of photography for example, to not understand the mid-modern impulses that gave rise to its invention, and the way that it was subsequently used, not always intentionally, to reshape and structure power in so many contexts, is to run the risk of repeating many of the same mistakes in ones work. Visual literacy then is no small part of this, but it is also a matter of technological literacy and history.

The project of reassessing the politics of a technology is perhaps made even more challenging in the case of things like photography where the notion of neutrality or objectivity is engrained into their cultural status. Photography still retains an aura of disinterested, objective, indexical

recording, even after two centuries of examples which have shown the problem with this idea. To cite Haraway, this is a disappearing act, the ability for a person (or in this case a technology) to make its viewpoint and the knowledge that it produces appear self-evident, as if it sprung from nowhere. Turning to space technology, there is again a similar problem. It is a field that has very often been wrapped in a cloak of peaceful, civilian scientific inquiry, and these foundation myths are still widely accepted without question. But I would contend that the real history of space exploration and space technology has been one of geopolitical and ideological competition between technocratic elites, often at the very direct expense of the people those same elites claimed to rule on behalf of.

The history of satellite imaging is, to put it mildly, incomplete, reflecting its genesis in the military-intelligence apparatuses of the United States and Soviet Union. But what we do know about it can still give us an interesting, glancing view into some of the problems of taking a technology at face value, as neutral and uncompromised. Between 2014 and 2018, I worked on *Shadows of the State* (2018), a project which focused on a globally distributed network of anonymous radio stations known as ‘numbers stations’. The international radio bands are incredibly tightly regulated and policed, yet these stations are entirely illicit, with no acknowledged owners; they broadcast unpredictably, jumping around the radio frequency bands, often illegally interrupting other broadcasts, including emergency transmissions. The operation of these stations is usually highly professional, and yet they broadcast nothing but seemingly random strings of numbers, often read by synthesised computer voices (Fig. 8.2).

Based on the best information available, these broadcasts constitute one part of a largely unknown geography of spy communications, which were used extensively during the Cold War to broadcast coded messages, and some of which continue to operate today (Bush, 2018). I spent four years using open-source research techniques to geolocate the likely transmission points for thirty of these stations, in the process revealing a

network of sites on every continent except Antarctica. Given the clandestine nature of this subject, simply visiting these locations would be fraught and, in some cases, physically impossible and so for this reason I turned to satellite imaging as a way to visualise these sites. This was at the time an entirely pragmatic choice, but in doing this, and researching the technology I was preparing to use, I began to see that the satellite maps that many of us use on a daily basis as we navigate unfamiliar territory are far from neutral.

The threshold moment occurred when I came across an unremarkable photograph with a remarkable history. A rectangle diagonally bisected, its top left half a deep black, and its bottom right half a blurry, grainy grey. This was the first photograph taken of the Earth from space, and the date attached to it, 24 October 1946, complicated what I thought I knew about the history of space exploration. Sputnik, the first man-made satellite, was launched more than eleven years later on 4 October 1957, and so my question was immediately who, and perhaps more importantly what, had taken this earlier photograph. The answer was so incredible to me that it led into another four-year project, *Depravity's Rainbow* (2023), which explored the politics of modern space technologies and the moral arc of historical choices. I soon learnt that that grainy photograph of earth was recorded by a camera mounted in the nose cone of a V-2 ballistic missile, fired from White Sands Missile Range in the United States. The V-2 was the first large ballistic missile, developed in Nazi Germany under a programme that rivalled the US Manhattan Project in its cost, scale and complexity, and was perhaps all the more remarkable because it was led by an aristocratic engineering prodigy and space enthusiast named Wernher Von Braun who was a mere thirty years old when the programme was at its peak (Bush, 2023) (Fig. 8.3).

At the end of the war Von Braun and many other German specialists were recruited because the United States, Russia and other Allied nations were keen to exploit some of the remarkable technical advances that Nazi Germany had made during the war, in fields like aerospace, ballistics

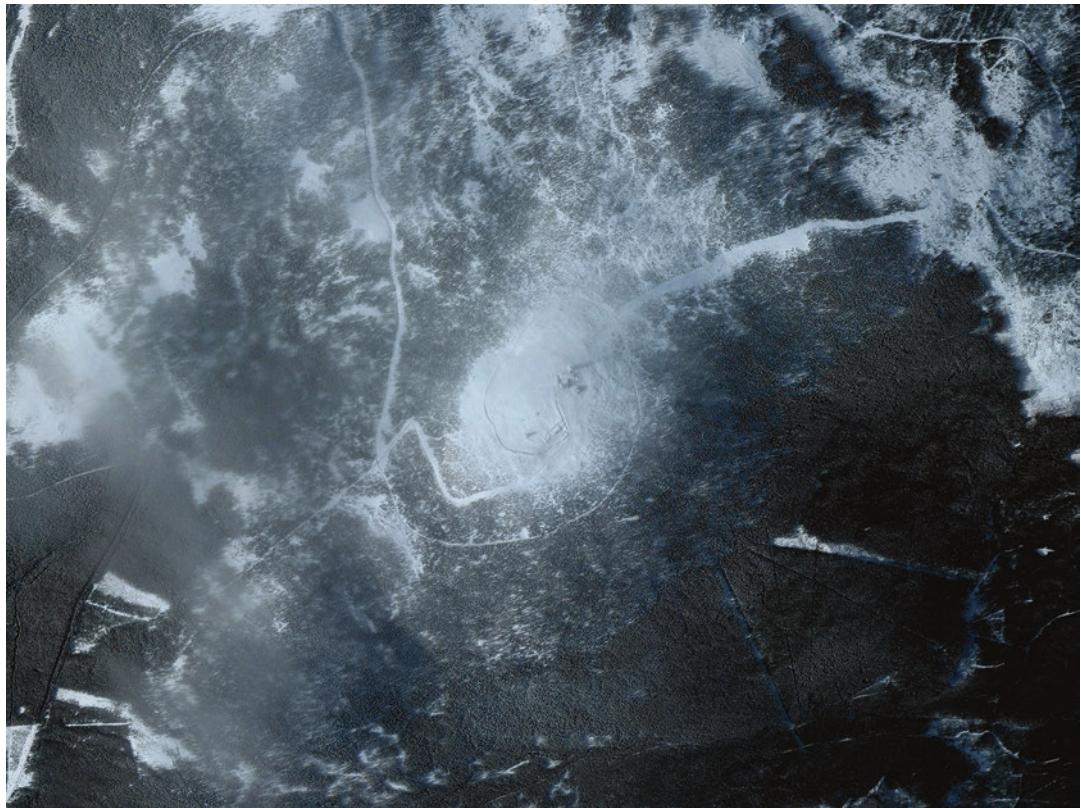


Fig. 8.2 KH-1 Corona satellite photograph of the Pentagon, Washington DC. Public domain satellite image 1967, from the series Shadows of the State (2014–2018)

and chemical weapons. But too few in the victorious countries questioned the virtues of recruiting men who had, at best, been silent bystanders to the worst crimes of Nazism, and in some cases had been actively complicit in them (Jacobsen, 2014; Neufeld, 2007).

Fewer still questioned whether the knowledge these men brought with them might itself also be tainted, both by its close associations with Nazi ideology, and by the fact that much of it was discovered through deeply unethical means. As an example, consider Dr Hubertus Strughold, who became known in the United States as the ‘father of space medicine’ for his work at NASA. Only after his death in 1986 did allegations start to emerge that linked Strughold to unethical medical experiments at Dachau concentration camp during the Second World War, where prisoners were subjected to freezing temperatures and lethal atmospheric pressures in order to simulate

the effects experienced by Luftwaffe pilots when they were shot down in combat. Despite criticism, it was only in 2013 that the Space Medicine Association withdrew an award named after Strughold which it had given annually for the past fifty years, which still maintained that the accusations were baseless even as it distanced itself from him (Lagnado, 2012; Scoles, 2020).

Given the willingness to turn a blind eye to knowledge which was self-evidently problematic, it is perhaps unsurprising that subtler questions were not asked about what ideas these engineers and scientists were bringing with them to the United States. Even those engineers who were not overt Nazi sympathisers were often still heavily influenced by the same milieu in which National Socialism developed, influenced by Social Darwinism, nationalism and imperialistic ambitions which had been turned towards the stars long before the technology had matured

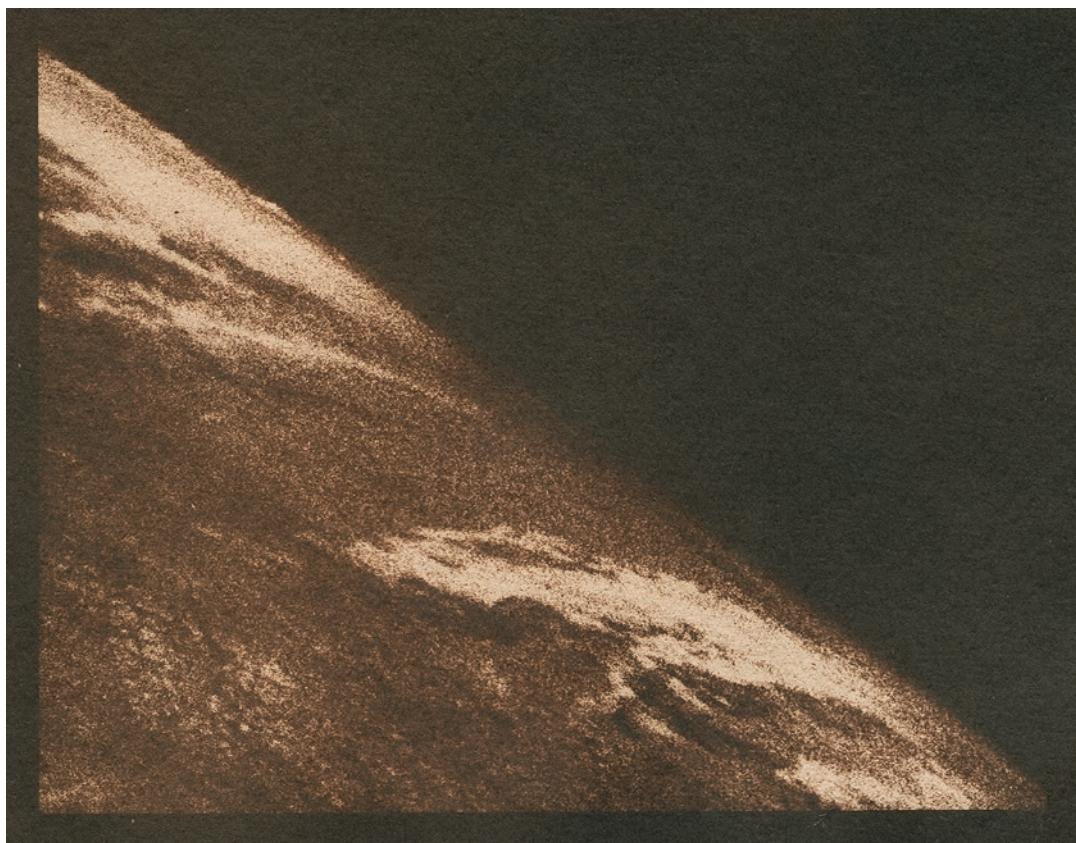


Fig. 8.3 The first photograph of the Earth taken from beyond the Karman Line, the internationally recognised boundary between earth and space. It was captured by a V-2 rocket with a camera mounted in its nose during post-war evaluation of the rockets in the United States (1947). Cyanotype print from archive photograph, printed 2022. From the series Depravity's Rainbow (2018–2022)

enough to actually reach them. Many of those involved in early rocketry spoke openly about their ambitions for the technology as a bridge-head to new imperial conquests in space, and while perhaps entirely coincidental, but the three countries where rocketry developed most rapidly in the early twentieth century; The United States, The Soviet Union and Germany were global powers either lacking empires or seeking to expand them. Such ambitions were not only limited to these newer players. In his last will and testament Cecil Rhodes, the colossus of British imperialism, wrote ‘To think of these stars that you see overhead at night, these vast worlds which we can never reach. I would annex the planets if I could’ (Rhodes & Stead, 1902).

Visions of rocketry and space exploration coloured by imperial ambitions were not the only ones, but what was notable was the way that the alternative visions gradually fell away and disappeared from the mainstream of rocket development. Part of the reason for this was that in 1920s, as rocketry had transitioned from a largely amateur affair to a closely guarded and militarised state secret, many of those who held alternative viewpoints, and saw rocketry in more utopian terms, were systematically excluded, or exempted themselves in horror, from its continued development. The same trend continued in the post-war era, in the United States where pacifist and socialist engineers and scientists often found themselves pursued out of the field. A compelling

example was the rocket developer and theorist Frank Malina, one of the co-founders of NASA's Jet Propulsion Laboratory and a direct American analogue to von Braun. Malina made little secret of his dislike of the recruitment of former Nazis and the military ends to which much of his work was being put, and postulated more utopian uses of the rocket. In the context of fears about communist infiltration these views led him to be placed under FBI surveillance and ultimately departed the United States for France and abandoned rocketry for a new career at UNESCO (Macdonald, 2019) (Fig. 8.4).

Of the German rocket enthusiasts who, like von Braun, were deemed ideologically reliable enough to remain working on rocketry for the Nazis throughout the war, many would go on to have a profound influence on the conceptualisation of space travel and technologies in the post-

war period, where they found at least some of these influences aligned relatively easily to those of a US government engaged in a geopolitical conflict with the Soviet Union communism.

The promise of space travel appealed aligned well with American ideas of manifest destiny and the frontier spirit, itself a colonial enterprise. In 1962 John F. Kennedy made his landmark Rice University speech, often known as 'We choose to go to the Moon' after one of its most rousing sections. In the speech, Kennedy made direct comparisons between efforts to reach space and the efforts of the first settlers who had conquered the lands that became known as the United States, directly quoting William Bradford, the founder of the Plymouth Colony. Bradford was reportedly present at the Mystic Massacre in 1637, where 700 members of the Pequot tribe were slaughtered by colonialists as part of the Pequot war,



Fig. 8.4 Mittelwerk factory complex, Nordhausen, Germany. A network of underground tunnels under the Brocken mountains, repurposed for weapons production, concentration camp inmates from the attached Mittelbau-Dora camp constructed thousands of V2 rockets here, including MW 18014, the first man-made object to cross the Karman line and reach space on 20 June 1944. Cyanotype print from own photograph taken 2019, printed 2022

and which set the template for many of the future interactions between the colonists and indigenous Americans. It seems telling that while people are today much more thoughtful about the language they use, and the way that once familiar expressions can allude to past histories of repression, violence and conquest. Yet space exploration remains one of the few areas where it is still common to unproblematically talk about ‘colonies and ‘colonising’. Other planets are places which are imagined to be empty virgin territories, ready for the taking, much as the explorers of old wrongly imagined the lands they conquered in the Americas, Africa and Asia as unclaimed and endless space, awaiting their arrival.

The guise of peaceful exploration and scientific inquiry into this ‘empty’ ‘new frontier’ ultimately proved useful cover the development of optical mapping satellites. The first such satellite system, the KH-1 Corona, was tested as part of a series of missions publicly known as ‘Discoverer’ perhaps for the similarity of this name to the earlier Explorer programme which launched the first US satellite in 1958. Discoverer/Corona gave way to a string of further optical intelligence satellites, known collectively by the codename Keyhole. The latest versions of which, the KH-11 Kennen are speculated to incorporate radar and optical stealth technologies to avoid detection. It is a technology, both making others visible, but also constantly engaged in performing its own literal and epistemological disappearing act.

The emergence of the first civilian mapping satellites from the 1970s onwards might well be taken as a successful example of turning these military tools to more benign uses. But intelligence agencies often remain closely involved in these civilian projects, contributing funding and technical expertise, on the basis that in return these agencies are able to ask these satellites for intelligence gathering purposes, or have them taken offline, denying anyone access to satellite mapping of sensitive locations. The status of many of these systems as proxy spy instruments is sometimes the thing that makes them commercially viable (Barnes, 2021; Hitchens, 2022). Publicly available satellite imagery is also often intentionally degraded by commercial providers

in order to maintain the pre-eminence of military users. At other times the maps are more directly edited at the request of intelligence agencies, for example blurring sensitive sites, or in some cases even replacing them with photoshopped in fields, woods or other camouflage. Mapping is also uneven, and the simple question of what gets mapped, when, reflects both commercial and military interests (Byre & Mehrotra, 2018).

A particularly striking example of the strange throughflow between civilian and military technologies exists in arguably the most widely used civilian satellite mapping tool. In 2000 a software development firm called Keyhole Inc (notable for being the same name generically used for US optical intelligence satellites) was founded in California, to develop geospatial visualisation technologies. It quickly attracted funding from In-Q-Tel, the Central Intelligence Agency’s venture capital arm, which explicitly exists to fund emerging high technologies which could give US intelligence agencies an advantage over their opponents. Keyhole’s primary product, known as EarthViewer, was licensed back to intelligence agencies to help analysts manage the increasingly vast quantities of satellite imagery being produced by the latest KH-11 Kennen spy satellites. Google acquired Keyhole in 2004, ultimately integrating EarthViewer into Google Earth, and the original corporate logo of the now-defunct Keyhole lives on as the logo of the Google Earth software (Levine, 2018).

Why does any of this matter? Because while these once clandestine technologies undoubtedly open new possibilities for journalism, art and other activities, it is far too simple to claim them as a victory of openness or the pacification of once military technologies. To return to Mumford’s contribution to thinking about what these things are, they are not simply things that reshape the world we live in, although they certainly do that. Technologies are also mirrors, both intended and accidental, of the way we think about the world, what it is, how it should be and how we should act in it. Complicating the often-simplified histories of these technologies is not to claim they have not brought benefits, but it is to say that in order to understand the possible

implications of new technologies, we still have much to learn from old ones. In this sense, neither technological determinism nor social constructionism fully account for the interaction between people and technologies. People make technologies, but technologies shape people.

References

- Barnes, J. (2021). Intelligence agencies pushed to use more commercial satellites. *The New York Times*. <https://www.nytimes.com/2021/09/27/us/politics/intelligence-agencies-commercial-satellites.html>
- Bush, L. (2018). *Shadows of the state*. Brave Books.
- Bush, L. (2023). *Depravity's rainbow*. Disphotic Editions.
- Byre, B., & Mehrotra, D. (2018). The one place in the US Google Earth stopped mapping, vice. <https://www.vice.com/en/article/gye79x/google-earth-stopped-mapping-this-military-installation>
- Garamvolgyi, F. (2022). Why US women are deleting their period tracking apps. *The Guardian*. <https://www.theguardian.com/world/2022/jun/28/why-us-woman-are-deleting-their-period-tracking-apps>
- Hitchens, T. (2022). How US intel worked with commercial satellite firms to reveal Ukraine info, Breaking Defense. <https://breakingdefense.com/2022/04/how-us-intel-worked-with-commercial-satellite-firms-to-reveal-ukraine-info/>
- Jacobsen, A. (2014). *Operation paperclip*. Little, Brown and Company.
- Jennings, H. (1985). *Pandaemonium 1660–1886: The coming of the machine as seen by contemporary observers*. Icon Books.
- Lagnado, L. (2012). A scientists Nazi-era Past Haunts Prestigious Space Prize. *Wall Street Journal*. <https://www.wsj.com/articles/SB10001424052970204349404578101393870218834>
- Levine, Y. (2018). *Surveillance valley: The secret military history of the internet*. Icon Books.
- MacDonald, F. (2019). *Escape from earth: A secret history of the space race*. Profile Books.
- McMullan, T. (2019). Are the algorithms that power dating apps racially biased. *Wired*. <https://www.wired.co.uk/article/racial-bias-dating-apps>
- Mumford, L. (1934). *Technics and civilization*. University of Chicago Press.
- Neufeld, M. (2007). *Von Braun: Dreamer of space, engineer of war*. Random House.
- Rhodes, C., & Stead, W. (1902). *The last will and testament of Cecil Rhodes*. Nabu Press.
- Scoles, S. (2020). The doctor from Nazi Germany and the search for life on mars. *New York Times*. <https://www.nytimes.com/2020/07/24/science/mars-jars-strughold.html>
- Winner, L. (2009). Do artifacts have politics. In Readings in the philosophy of technology, edited by David M. Kaplan.



The Algorithmic Apparatus of Neocolonialism: Counter-Operational Practices and the Future of Aerial Surveillance

Anthony Downey

Human beings must learn anew to recognize the pattern of the earth from the perspective of the air.

—Harun Farocki, *Images of the World and the Inscription of War*, 1988

I

What forms of aerial threat do communities across the globe endure today, and how do they differ from previous levels of exposure? If we consider the apparently unstoppable ascendancy of drone reconnaissance and satellite surveillance, then it is evident that we are undergoing an epoch-defining evolution in the deployment of aerial technologies.¹ The multiple concerns raised by civilian, civil rights, humanitarian, and military agencies in relation to autonomous systems of warfare would suggest that such operations

have likewise realigned the relationship between the material (physical, environmental, legal) and immaterial (psychological, ethical, and existential) impact of these technologies.² In conjunction with the enhancements afforded by Artificial Intelligence (AI), algorithms, and machine learning, autonomous systems of surveillance and warfare also engender less immediately visible forms of trauma. Ranging as they do from psychological trauma to the toxic contamination of habitats, not to mention the chronic threat associated with unexploded ordnance, the concern here becomes not so much whether consequences of these technologies have changed over time, but how we critically engage with the immaterial and nonphysical repercussions of such systems.

To these already imminent concerns, we could go further and observe that the technologies that commandeer and exploit airspace are not *only* detrimental to those who are subject to their

¹See, for example, Derek Gregory, “From a View to a Kill: Drones and Late Modern War,” *Theory, Culture & Society* 28, nos. 7–8 (2011): 188–215; Medea Benjamin, *Drone Warfare: Killing by Remote Control* (London: Verso, 2013); John Kaag and Sarah Kreps, *Drone Warfare* (Cambridge: Polity Press, 2014); Grégoire Chamayou, *Drone Theory* (New York: Random House, 2015); Hugh Gusterson, *Drone: Remote Control Warfare* (Cambridge, MA: MIT Press, 2016); Ian G. R. Shaw, *Predator Empire: Drone Warfare and Full Spectrum Dominance* (Minneapolis: University of Minnesota Press, 2016); Lisa Parks and Caren Kaplan, eds., *Life in the Age Of Drone Warfare* (Durham, NC: Duke University Press, 2017); Atef Abu Saif, *The Drone Eats with Me* (Manchester: Comma Press, 2015); and Rebecca A. Adelman and David Kieran, eds., *Remote Warfare: New Cultures of Violence* (Minneapolis: Minnesota University Press, 2020).

²See Michael J. Boyle, “The Legal and Ethical Implications of Drone Warfare,” *International Journal of Human Rights* 19, no. 2 (2015): 105–26.

A. Downey (✉)
Birmingham School of Art, Birmingham City
University, Birmingham, UK

ubiquitous apparatuses, the logistics of their deployment is also prosecuted through narrow national preoccupations of states who are party to developing the legislation that governs their use. Given the relatively inaccessible and occluded disposition of AI systems, the continued levels of secrecy and defensive concealment raise further questions: How, for one, do we conceptualize the threat associated with both the opacity of “black-box” systems and the all-too-real impact of air-bound technologies that, to a large extent, remain beyond the purview and control of the vast majority of the world’s population? All of which begs another, admittedly more capacious, question: How do we effectively engage with these largely classified, off-the-record, clandestine processes? We might, thereafter, want to probe further and inquire into whether the moment of visualizing these activities effects a form of engagement that can reconceptualize the military-industrial-corporate entanglements of airspace and, in so doing, productively hold such technologies to account. Can the *mise-en-abyme* of black box-like technologies be negotiated with or, indeed,

modulated by methods of envisioning their operative logic—and, if so, how might this be achieved? (Fig. 9.1)

It is with these questions in mind, among others, that Shona Illingworth’s practice methodically pursues—through interdisciplinary partnerships and research networks—a series of investigations that coalesce around two inter-linked projects: the three-screen video and sound installation *Topologies of Air* (2021) and the Airspace Tribunal (2018–ongoing), the latter being a series of in-progress “people’s tribunals.” Operating as a mutually supportive visual platform and legislative forum for exploring how air-bound technologies adversely affect communities, both projects prompt an expanded horizon upon which to understand the complexities—political, legal, historical, and cultural—of visualizing air- and outer-space. These strategic approaches to the question of air- and outer-space evoke pressing existential concerns that include, but are not limited to, the weaponization of non-terrestrial environments, climate change, environmental destruction, biodiversity

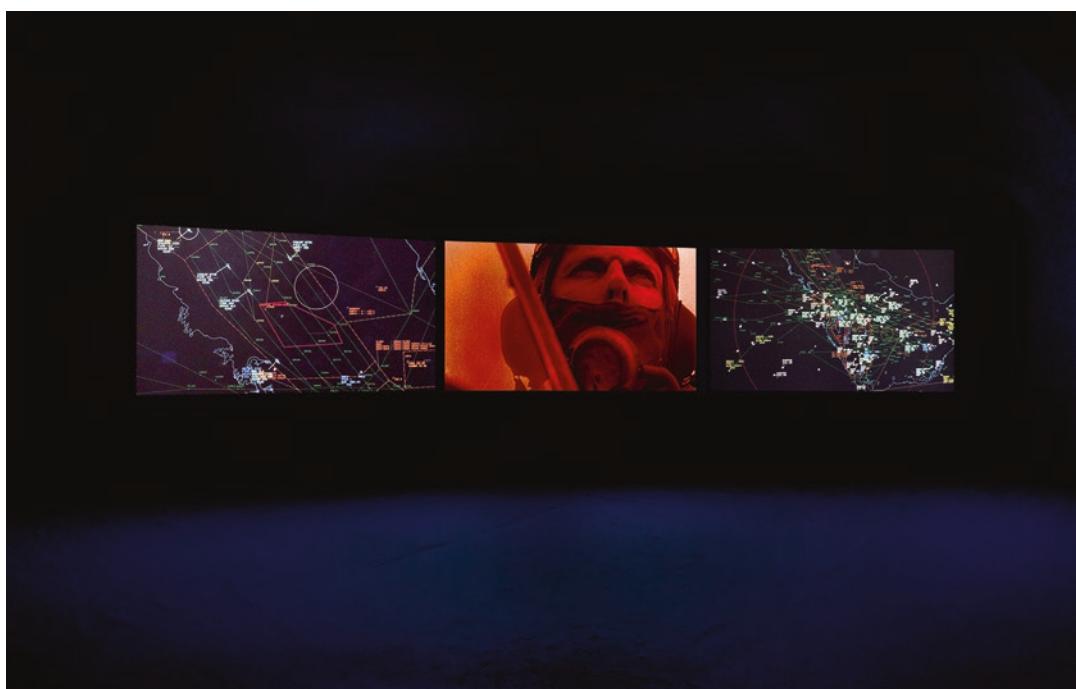


Fig. 9.1 Shona Illingworth, *Topologies of Air*, 2021. Three-channel digital video and multichannel sound installation, 45 min. Courtesy of the artist. Installation view: *Topologies of Air*, The Power Plant, 2022. Photo: Toni Hafkenschied

loss, ontological insecurity, nuclear threat, and the corrosive forms of disparity that define the global landscapes of political power and corporate proprietorship.

To observe as much is to note that the research-based activities that we associate with practices from within the field of contemporary visual arts—including Illingworth’s and others—have historically inquired into the technologies of image production, reception, and dissemination.³ In their use of speculative, qualitative forms of visual inquiry, we may want to examine how such practices produce quantitative or evidentiary methods for understanding the impact of these technologies on life patterns and the lives lived in their shadow. Can, we need to ask, the interpretive and heuristic context of art practice, operating as it does from within the methodological framework of visual cultures, identify and distinguish the ramifications of satellite surveillance and drone reconnaissance on the realities of life and, increasingly, death?

In what follows, I will propose that any answer to this question, however approximate it may be, needs to consider the sinuous, utilitarian, extractive technologies of colonization and, successively, the neocolonial annexation of present-day and future realities. It is there that we can register and critically evaluate the degree to which the history of drone reconnaissance and satellite surveillance is irrefutably imbricated within colonial practices, nowhere more so than when we consider the latter’s reductive determinations of life and death and the callous calculations that inform the neocolonial will to actuate ascendant forms of biopolitical control.

II

Activities from the realm of extraterrestrial space not only map but also strive to predict future terrestrial movement, be it of troops, weather patterns, urban development, or population flows. Drone- and satellite-based forms of surveillance, powered by the predictive function of algorithms, seek to determine inextricably convoluted patterns of force and counterforce. To fully understand this ecosystem, and to deconstruct its amalgamations, we need to think from *within* these integrated exercises of command and power rather than merely commenting upon them—how exactly do they operate and relate to one another? In certain key images, some of which recur throughout *Topologies of Air*, we are invited to consider a drone view of the world below, from verdant rainforests to postindustrial landscapes. In one section, we vertiginously descend into a Dilmun burial mound in Bahrain from hundreds of feet above, our infernal descent sentry by images of environmental devastation (see Fig. 9.2).⁴ This is not merely the act of representing the innards of an extended necropolis, alongside images of despoliation; it is also an invitation to occupy a privileged viewing position that draws attention to how power operates vertically in our age of perpetual surveillance and indefatigable scrutiny. To be afforded this view is to become an appurtenance or supplement to the power wielded. Involved as we are in the so-called birds-eye or god-like view, we are entangled within the paraphernalia of the scopic regime associated with aerial technologies and the imperial ambition of the god-like, disembodied gaze.⁵

Such consideration moves us away from formal questions—*how do we represent aerial activities that are often designed to evade detection*—to concerns about agency: What positions

³I would note here, albeit in passing, the work of Heba Y. Amin, Helene Kazan, Forensic Architecture, Trevor Paglen, and, of course, Harun Farocki, the latter being the filmmaker and theorist often credited with forging the original inquiry into the economy of image production—and the emergence of “operational images”—in a postindustrial age through films as varied as *Images-War* (1987), *Images of the World and the Inscription of War* (1988), *Eye/Machine I, II, III* (2001, 2002, and 2003), and *War at a Distance* (2003).

⁴These burial mounds are protected as part of a UNESCO World Heritage site in the north of the island of Bahrain. They are evidence of the early Dilmun civilization, which prospered around the second millennium BCE, when the island was a trading hub for the region.

⁵See Kathrin Maurer, “Visual Power: The Scopic Regime of Military Drone Operations,” *Media, War & Conflict* 10, no. 2 (2017): 2.



Fig. 9.2 Shona Illingworth, *Topologies of Air*, 2021. Video stills. Courtesy of the artist. Centre image, courtesy of Moesgaard Museum

can we adopt and adapt in relation to the activity of aerial surveillance? To raise these reservations is to more fully consider the overarching operational logic of the apparatuses that produce present-day realities—be they cartographic, photographic, or digital—and how they found their organizational structures and conceptual footing in racially deterministic colonial discourses that strove to “fix” the other as an objectified, calculable entity. This other, which was often seen to possess the ontic, quantifiable character of the real, rather than inhabiting a phenomenal existence (i.e., living a form of life that was commensurate with Western-centric definitions of humanness), was rarely viewed as an ontological subject capable of *being* in the world. This calculable, measurable, knowable other is, as we will see, foundational to the historical shift that we associate with the reinscription of the “imaginative command” of colonial discourse into the algorithmic calculations that we now associate with the mechanisms and contrivances of neocolonization.⁶

When we consider our responsiveness to and responsibility for interpreting activities that are intentionally rendered distant—often by virtue of literal remoteness—and opaque by the “black-box” logic of computational decision-making processes, the demand for legibility becomes a political act in itself; one that prefaces, or at least frames, an injunction towards further formal inquiries. What are the implications of exerting

command, be it imaginative or algorithmic, over a people or terrain? Often used to describe the operational logic of drone and satellite surveillance technologies, the phraseology surrounding so-called black-box systems would appear to repudiate precisely such a question, or at least discourage or suppress scrutiny of its operative logic. Likewise, when we envisage the degree to which the programmatic processes associated with AI and algorithms exclude, if not prohibit, human input and cognitive interpretation, we find further evidence of a series of recursive and occluded procedures over which we have no means to exercise effective oversight, be it legal or otherwise.

This indecipherability is central to the functioning of drones and satellite systems, which often operate in an autonomous or semiautonomous continuum. It is this secured functioning that has increasingly produced a conspicuous level of individual and collective detachment, whereby the stimulus of human decision-making in the operating procedures of autonomous weapons systems is, at best, moot and, more often than not, relegated to the role of either pre-programming or calibrating systems over which operators have less and less competency. As a result, we would appear to be witnessing a widespread moral, social, political, and cultural renunciation of responsibility when it comes to the fatal use of aerial surveillance and targeting.⁷ This specific point has been addressed by

⁶I borrow this phrase from Elleke Boehmer, who writes that “to assume control over a territory or a nation was not only to exert political or economic power, it was also to have imaginative command.” See Elleke Boehmer, *Colonial and Postcolonial Literature* (Oxford: Oxford University Press, 2005), 5.

⁷See Jeremy Packer and Joshua Reeves, *Killer Apps: War, Media, Machine* (Durham, NC: Duke University Press, 2020). See also, Peter M. Asaro, “The Labor of Surveillance and Bureaucratized Killing: New Subjectivities of Military Drone Operators,” *Social Semiotics* 23, no. 2 (2013): 196–224.

Illingworth and Andrew Hoskins in their jointly authored essay, “Inaccessible War: Media, Memory, Trauma and the Blueprint,” published in 2020.⁸ Proposing that the “comparatively silent revolution in military and militarized data and AI” submits civilian populations to newer, emerging forms of trauma, the authors focus on the psychological and neuropsychological impact of unrelenting surveillance. Trauma, they argue, has shifted “from a memory of the past to include a perpetual anticipation of the threat of the future, subjecting increasing numbers of people to unending physical and psychological incarceration in a traumatizing present.”⁹

The potential of practice-based research, such as Illingworth’s, lies precisely in its ability to provide discursive and visual methods—for legal and scholarly frames of reference—to detail the changing nature of the psychological impact of such technologies. It is through the interdisciplinary approaches that are applied to the visualization and conceptualization of airspace, in both *Topologies of Air* and the Airspace Tribunal, that we see how evidentiary practices (in the context of the visual) and legal debates (that is to say, the realm of legislation) can produce a critical dialogue about the epistemological “value” attached to the data harvested by surveillance systems and, thereafter, applied to predict, if not predetermine, future patterns of life and death.

How “evidence” is understood and verified in a court of law, or considered within legal processes such as those governing the use of weapons, become further issues of concern here. By inquiring into how data (information) is given an epistemological value through systems that remain largely withdrawn from legal oversight, Illingworth’s installation and tribunal-based platform make transparent an operational logic that has long been structured around opaque processes. In focusing interdisciplinary activities and legal testimony on a formal, fact-based presentation of evidence and peer-reviewed research,

Illingworth sets about detailing the substance of the present-day and future-oriented threat that communities and individuals experience from airspace. To this end, *Topologies of Air* and the Airspace Tribunal jointly propose a structured case for pursuing new legislation from *within* an understanding of human rights as a “living instrument” and *through* an expanded notion of what we mean when we refer to air- and outer-space.¹⁰ Practice-based research, in sum, both aggregates and proposes a formal methodological approach *towards* the promulgation of a new human right in the face of unaccountable forms of “black-box” technology.

III

The algorithmic rationalization of data harvesting and storage remains a contingent process whereby we can witness an “input” and an “output” and yet remain unaware of the internal machinations by which “raw” data becomes material evidence of, for example, nefarious activities or wrong-doing. This structure needs to be declared tangible if we are to critically address its systematic application to, for example, a zone of conflict. We need, in sum, to think from *within* the occluded interiors of these operations.¹¹ As part of this process, we could begin by questioning the very idea of “raw” data—in its capacity as “input”—and observe that any decision, algorithmic or otherwise, to harvest or extract information presupposes a highly defined (ideological, political, national, monetary, and strategic) prior

¹⁰The phrase “living instrument” has been used elsewhere in this volume by Hoskins and Illingworth in reference to the 2020 European Court of Human Rights Judicial Seminar. See “The Convention as a Living Instrument at 70,” Background Document, 3: https://www.echr.coe.int/Documents/Seminar_background_paper_2020_ENG.pdf.

¹¹See, for example, Cynthia Rudin and Joanna Radin, “Why Are We Using Black Box Models in AI When We Don’t Need To? A Lesson from an Explainable AI Competition,” *Harvard Data Science Review* 1, no. 2 (2019). See also Cynthia Rudin, “Stop Explaining Black Box Machine Learning Models for High Stakes Decisions and Use Interpretable Models Instead,” *Nature Machine Intelligence* 1 (2019): 206–15.

⁸Andrew Hoskins and Shona Illingworth, “Inaccessible War: Media, Memory, Trauma and the Blueprint,” *Journal of Digital War* 1 (2020): 74–82.

⁹Hoskins and Illingworth, “Inaccessible War,” 74.

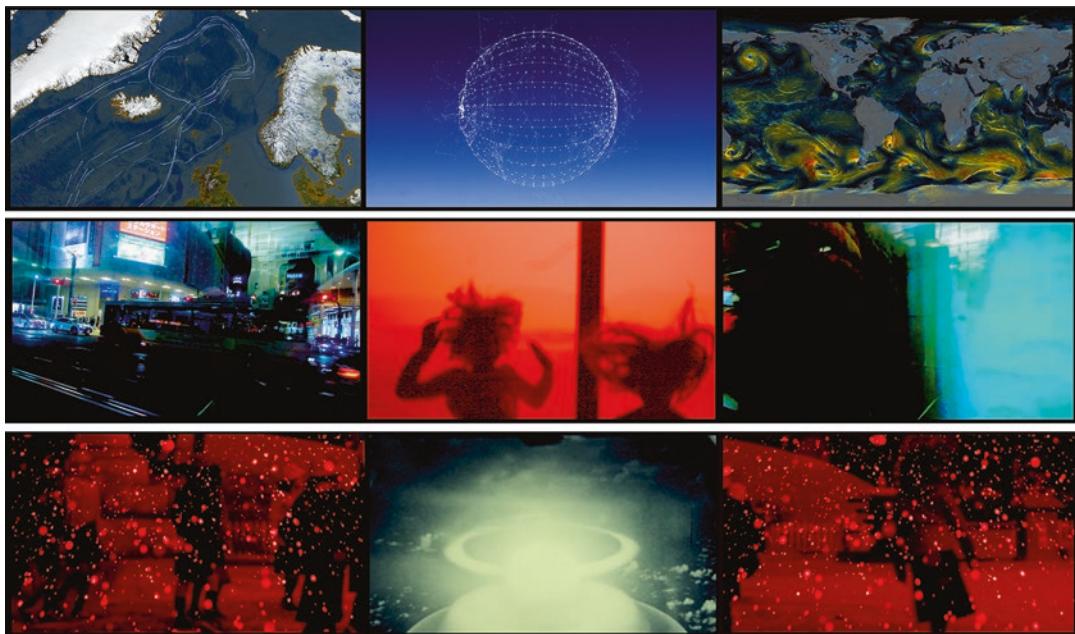


Fig. 9.3 Shona Illingworth, *Topologies of Air*, 2021. Video stills. Courtesy of the artist. Archive images courtesy of the Imperial War Museum, London, and NASA

interest in the epistemological value of such information. The collation of intelligence based on preconceived notions of threat, or data labeling, has given rise to, as Jutta Weber observes, a “data-driven killing apparatus.” This is a systematic arrangement that entangles and renders opaque levels of human and non-human decision-making methods in the pursuit of a “possibilistic, preemptive culture of technosecurity.”¹² The amassing of metadata—that is, data about data—likewise concentrates the activity of lived life into sequences of anonymous information, so much so that the “convergence of metadata systems and digitised identification systems exemplifies the rendering of life into an orderable system of information through the application of algorithmic formulae.”¹³ Considering how exist-

ing (neo)colonial representations of the “Middle East,” both real and imagined, often encode the entire region as the incarnation of an enduring threat to so-called Western interests, we need to understand this pre-emptive, fatalistic logic in the context of the labeling and subsequent computation of (meta)data. The algorithmically calculated phantasm of insurgency, that is to observe, provides a consistent rationale for present-day and future occupation, be it virtual or otherwise (Fig. 9.3).¹⁴

The future of war has been categorically programmed into algorithms. The supposed epistemological opacity of algorithmic operations, cultivated by military-industrial and commercial interests, strategically disavows this fact alongside the extent to which such systems are demon-

¹² Jutta Weber, “Keep Adding. Kill Lists, Drone Warfare and the Politics of Databases,” *Environment and Planning D. Society and Space*, 34, no. 1 (February 2016): 107–125 (108).

¹³ Joseph Pugliese, “Death by Metadata: The Bioinformationalisation of Life and the Transliteration of Algorithms to Flesh”, in *Security, Race, Biopower: Essays on Technology and Corporeality*, ed. Holly Randell-Moon and Ryan Tippet (Palgrave Macmillan, 2016), pp. 3–20 (6).

¹⁴ See Anthony Downey, “The Algorithmic Apparatus of Neo-Colonialism: Or, Can We Hold” Operational Images” to Account?”, *The Nordic Journal of Aesthetics* Vol. 30, No. 61–62 (2021), 78–82. See also, Anthony Downey, “The Future of Death: Algorithmic Design, Predictive Analysis, and Drone Warfare”, in Jens Bjering, Anders Engberg-Pedersen, Solveig Gade, and Christine Strandmose Toft, eds. *The Aesthetics of War: Art, Technology, and the Futures of Warfare*, (Cambridge, Mass.: MIT Press, forthcoming 2024).

strably produced from within societal orders. Trained on patterns of data harvested from online user behavior, algorithms are essentially social constructs powered by Big Data. We could likewise observe here the degree to which the operative logic of AI, configured as it is through the statistical rationalization of data, produces structures and categories of epistemic violence to justify the event of actual violence. Given the foundational, if not potentially fatal, nature of their constitution there is an urgent need to deconstruct the “black box” rhetoric that surrounds these apparatuses. A crucial element here, in relation to terrestrial and extra-terrestrial “black box” surveillance systems (the realms that form the conceptual keystones for both *Topologies of Air* and the Airspace Tribunal), is how we can make direct connections between the extraction of data—through, for example, surveillance technologies—and its alignment with the national, military, and commercial interests of Western nations and others such as China and Russia.

These questions are further convoluted if we consider how sovereign (national) and military-industrial interests are entangled with those of privately owned companies that were originally endorsed by venture capital models of investment.¹⁵ In this scenario, private money demands, at the behest of shareholders, ever more perilous means of extracting—through remote technologies such as drones—information that refines and trains the targeting systems of military weapons and the proprietary concerns of privately owned companies.¹⁶ As a direct result this secretive, difficult-to-access, recalcitrant regime of data extraction and application, communities and individuals on the receiving end of such technologies

live in states of hyper-alertness, always on the lookout—or, more likely, given the remoteness of such technologies, listening out—for an imminent assault or an act of irrevocable violence.

Although often presented as an objective “view from nowhere,” AI constitutes a contemporary regime of Western power that maintains historical forms of colonial violence. These processes are increasingly evident in the deployment of Unmanned Aerial Vehicles (UAVs) and Lethal Autonomous Weapons (LAWs). Observing the use of UAVs and LAWs in the Middle East in particular, it is crucial that we critically outline the historical evolution of such apparatuses and their reliance on autonomous models of image production. This will involve examining colonial cartographic methods, aerial photography, photogrammetry, and the ascendancy of “operational images,” all of which—in a prelude to the operative logic of algorithmic rationalizations of threat—involve the delegation of the ocular-centric, corporeal event of seeing and thinking to the autonomous realm of the machinic.

IV

From the early stages of *Topologies of Air*, there is an explicit focus on non-Western geographies that are, for the most part, the object of a Western-centric optical regime—based on the selective concentration and application of knowledge—that has been effectively resuscitated by the (neo) colonial operations of drone reconnaissance and satellite technologies. In one telling image, depicting a satellite surveying a tract of the Arabian Peninsula, Iran, and the Horn of Africa, we see a panorama of a region—the so-called Middle East—that has long been subject to increasingly complex systems of surveillance.¹⁷ These aerial shots of a satellite graphically reproduce an encounter that suggests, as noted above, a distinctly vertical relationship between the

¹⁵For an insightful account of how military, industrial, and entertainment interests coalesce, see James Der Derian, *Virtuous Warfare: Mapping the Military-Industrial-Media-Entertainment Network* (Boulder: Westview Press Inc., 2001). See also Paul Virilio, *War and Cinema* (London: Verso, 1989).

¹⁶For a review of Google’s involvement in drone technology, see Lee Fang, “Google Hired Gig Economy Workers to Improve Artificial Intelligence in Controversial Drone-Targeting Project,” *Intercept*, March 6, 2018, <https://theintercept.com/2019/02/04/google-ai-project-maven-figure-eight/>.

¹⁷See Anthony Downey, “There’s Always Someone Looking at You: Performative Research and the Techno-Aesthetics of Drone Surveillance,” in *Heba Y. Amin: The General’s Stork*, ed. Anthony Downey (Berlin: Sternberg Press, 2020), 8–30.

viewing (sovereign) subject and the perceived (targeted) object. It is with these and other points in mind that *Topologies of Air* plots the operational modifications and technical variations of the one-time imperial and now neo-imperial ambition to maintain an “imaginative command” over its self-appointed dominions.

In an observation by Edward Said, writing in 1995, the degree to which geography is always already “the art of war” neatly sums up a historical fact: cartographic mapping, in imperial and colonial contexts, was both a predictive activity (foreshadowing as it did the region in question) and a prioritized means of substantiating (in the establishment of so-called boundaries) and maintaining dominance and control.¹⁸ Surveillance and remote forms of mapping, which remained impenetrable to those who were subject to their sphere of influence and applied forms of power, were evident in the first triangulation-based map of Egypt, Syria, and Palestine. Published between 1809 and 1829, and comprised of 885 plates, a 3-sheet geographic map, and a 47-sheet topographic map of Egypt, the latter triangulation-based maps were produced by Napoleon as part of his monumental *Description de l’Égypte*. These maps were to become the basis for further cartographic surveys throughout the nineteenth century and, in testament to their enduring use and application, were only superseded by photographs produced by cameras mounted to airplanes during World War I.

The photographic images taken from aerial perspectives were, to begin with at least, concerned with the professed purpose of mapping archaeological sites, antiquities, and monuments (a historical fact noted throughout *Topologies of Air*), with hundreds of thousands of aerial photographs produced under the pretext of “preservation.”¹⁹ In the intermediate decade or so of this timeline, encompassing as it does triangu-

lated mapping in the late eighteenth century and the development of aerial photographs in the early part of the twentieth century, another innovation was to have a profound impact upon these remote technologies of erasure and legibility—namely, the invention of photogrammetry by the Prussian architect Albrecht Meydenbauer (1834–1921).

First coined by Meydenbauer in 1867, the concept of photogrammetry was simple enough: rather than measure a building by “hand” and in close personal proximity to it (an activity that often courted peril), measurements could be taken directly from multiple photographs of the same building taken from different angles.²⁰ These indirect, remote forms of measuring from a distance introduced an automated model of vision that displaced, or separated, the human eye from the object under consideration and, thereafter, replaced it with an activity that takes place from *within* the virtual, codified space of a photograph rather than *in direct relation* to an actual object or building under consideration. This apparent simplicity of method was to have lasting connotations when we consider how, through aerial photography in particular, photogrammetry promoted a process of disembodied, automated sight that usurped accepted ontologies of envisioning realities.

The move towards the automation of sight and the ensuing questioning of its role in producing realities, evident in the 1798 topographical surveys of Egypt, Syria, and Palestine, can be seen in how the maps in question were projected from ground positions to produce aerial overviews. This would suggest, *prima facie*, that the disincarnated, projected gaze was promoted from *within* the technology of mapping.²¹ And central

¹⁸Edward Said, “Facts, Facts, and More Facts,” in *Peace and Its Discontents: Essays on Palestine in the Middle East Peace Process* (New York: Vintage, 1995), 26–31, 27.

¹⁹See Robert Bewley and David Kennedy, “Historical Aerial Imagery in Jordan and the Wider Middle East,” in *Archaeology from Historical Aerial and Satellite Archives*, ed. William Hanson and Ioana Oltean (New York: Springer, 2013).

²⁰For a fuller account, see Jörg Albertz, “Albrecht Meydenbauer: Pioneer of Photogrammetric Documentation of the Cultural Heritage,” *Proceedings 18 International Symposium CIPA* (Potsdam, Germany, September 18–21, 2001).

²¹Writing in 1941, Frederick Stansbury Haydon observed that the French Balloon Corps, effectively the first air force in the world, did accompany Napoleon on his campaign to Egypt in 1798 but with mixed results. See Frederick Stansbury Haydon, *Military Ballooning during the Early Civil War* (Baltimore, MD: John Hopkins Press, 2000), 13–15.

to these technologies, we find the instrumentalizing gaze of the cartographer, the all-seeing eye who commands an ethereal view of the terrain below (from a projected vantage point) and reproduces it through the determinants, or data points, we associate with the mapping (numeric and symbolic fixing) of people and places.

Returning to our earlier discussion of implied epistemological value, this emphasis on the “instrumentality of knowledge” has been noted by Anne Godlewska, who, writing of Napoleon’s cartographic ambitions, observed “how cartography as mapping assigns a position to all places and objects. *That position can be expressed numerically.*”²² Continuing this critique of the computational logic underwriting cartographic practice, Godlewska further proposes: “Maps allowed a coordination and concentration of intrusion that was relatively covert, thanks to the inherently elite and secretive nature of the cartography of this period and to the centralized coordination that maps permitted and perhaps encourage. It was, then, an extremely *effective instrument* of imperialism, and powerful consonance with the ideals of the Enlightenment.”²³

The Cartesian calibration of space through the human eye, the extraction of information based on the fixed position of the subject in relation to an object, not only anticipates technologies of automated measuring—photogrammetry, for example—but also predicts the formal components of autonomous surveillance and weapons systems today.²⁴ To the extent that this

computational logic adumbrates the present-day ascendancy of autonomous drone-based surveillance systems, it leads us back to our earlier question: How do we think from *within* this operational logic rather than merely comment on it? To do so, we need to more fully consider *how* a photograph instrumentalizes or programs our sight from within the codified space of the photographic apparatus, as is the case with photogrammetry. This is to encourage a range of inquiry into the operational “how” rather than the conceptualized “what” of image production. It is to entertain a discussion of so-called operational images—images that are made by machines for machines—and how the technologies of our contemporary neocolonial image regime do not necessarily involve images that are visible to the human eye.

Referring to a term popularized by the filmmaker and theorist Harun Farocki, “operational images” are produced by machines for machines.²⁵ These images therefore remain “unseen” by and inaccessible to the human eye. This presents us with an ontological dilemma: How do we thereafter conceptualize our responsibility for and responsiveness to images we cannot access nor perceive? If, thereafter, Bishop Berkeley’s adage—*esse est percipi*; or, to be (*esse*) is to be perceived (*percipi*)—is to remain apt in our post-digital age, then we must ask a further question: What forms of *being*, sovereign or otherwise, are brought forth into our contemporary world if the act of “perception,” if not the formal actualization of humanness (*being*), is performed by a machine? If we accept that established ontological frames of reference, which have to date substantiated human rights legislation and international laws, are being surreptitiously usurped by statements of autonomously calculated fact, then the over-arching challenge here becomes one of how we can, if at all, productively interject—legally, philosophically, creatively, and politically—into the contemporary

²²See Anne Godlewska “Map, Text and Image. The Mentality of Enlightened Conquerors: A New Look at the *Description de l’Egypte*,” *Transactions of the Institute of British Geographers* 20, no. 1 (1995): 5–28, 6 (emphasis added). See also, Anders Engberg-Pedersen, *Empire of Chance: The Napoleonic Wars and the Disorder of Things* (Harvard: Harvard University Press, 2015), 147–156.

²³Godlewska, “Map, Text and Image,” 18 (emphasis added).

²⁴For a fuller account of these correspondences between Cartesianism and the modern technologies of warfare, see Antoine Bousquet, *The Eye of War: Military Perception from the Telescope to the Drone* (Minneapolis: University of Minnesota Press, 2018), *passim*.

²⁵Farocki used the phrase “operational images” to describe images made by machines for machines, the full implications of which he explored throughout his three-part film *Eye/Machine I, II, III* (2000–3).

rationalizations of life and death brought about by the affordances of drone and surveillance technologies.

Photogrammetry, like cartography before it, expressed the world numerically and at one remove from the actual; however, this move towards the industrialization of automated image production, through remote technologies, necessitates the production of an industrial, mechanized, and programmable means to survey and interpret images. For Farocki, the “operational image” answers to this demand through superseding the function of the human eye.²⁶ Insofar as they are part of a machine-based operative logic, images made by machines for machines are effectively void of an aesthetic context—they do not, as Farocki proposes in *Eye/Machine I, II, III* (2000–3), “portray a process but are themselves part of a process.” This practical functioning means that images are not only voided of social or aesthetic intent; they also anticipate the formal obsolescence of the human eye. Structurally defined by the operation in question, “operational images” are not propaganda (they do not try to convince), nor do they instruct (they are not interested in directing our attention), nor are they content-based (they exist as abstract binary data coding, rather than pictograms). Given that they are part of an operation, any manifestation of the image through the disincarnated modus operandi of “operational images” is therefore merely an anachronistic concession to the human eye.²⁷

If “operational images” are wholly disinterested in human input, apart from initial programming and our occasional calibration of their

operational apparatus, then our agency in these forms of image production and their impact (consider how drones use algorithmically trained operational images to target and eliminate subjects) remains circumstantial at best. Computers, whether engaged in cartographic processes or the targeting of “combatants,” do not use images, nor do “operational images” function in this sense.²⁸ Arguably, the contemporary image of conflict is indeed a compromise of sorts, an anthropological sop produced by machines to make us feel more comfortable and familiar with the operational logic and real-world impact of “vision machines.” Have we, as a result, disavowed our responsibility for such calculations precisely on the grounds that the affordances of aerial surveillance and drone warfare profoundly distance us—physically, psychologically and psychically—and in that process attempt to circumvent political and legal oversight? And, if so, how can we deploy creative practices and their interdisciplinary processes to critically address the fatal global interlocking of surveillance technologies, territorial plotting, imperialist expansionism, and drone warfare? These questions are, needless to say, the explicit domain of human rights legislation (as noted throughout the Airspace Tribunal), but they also raise a series of concerns about how we determine the epistemological value and agency, not to mention epistemic violence, of “operational images”—the very same “immaterial,” digital images that can impact everyday realities with often devastating, if not deadly, results.

²⁶ Anticipating “operational images” in all but name, Paul Virilio predicted the use of “vision machines” in the context of military robotics as an inevitable outcome of such technologies, driven as they are by conflict. See Paul Virilio, *The Vision Machine*, trans. Julie Rose (London: British Film Institute, 1994), 59.

²⁷ See Trevor Paglen, “Operational Images,” *e-flux Journal*, no. 59 (November 2014), http://worker01.e-flux.com/pdf/article_8990555.pdf.

²⁸ “The operational image emulates the look and feel of traditional images, but on closer inspection, this turns out to be a secondary function, almost a gesture or courtesy extended by the machines: The computer does not need the image.” Volker Pantenburg, “Working Images: Harun Farocki and the Operational Image,” in *Image Operations: Visual Media and Political Conflict*, ed. Jens Eder and Charlotte Klonk (Manchester: Manchester University Press, 2017), 49–62, 49.

V

I earlier quoted Said's assertion that geography is "the art of war"; it might be therefore useful to continue his thoughts on the matter and draw attention to the fact that he also proposed that geography can be the "art of resistance if there is a counter-map and a counter-strategy."²⁹ This recalibrates our original question from an inquiry into what forms of trauma and imminent aerial threat communities across the globe endure today, to what counterstrategies are available to us in order to address this state of affairs. On one level, this is, dare I say, relatively straightforward: in drawing attention to the ideological, national, corporate, historical, and proprietorial intent inherent within the apparent objectivity of a map, we readily if not critically engage—through the form of *Topologies of Air* and the forum of the Airspace Tribunal—with its assumptions and framing of reality. To this, we must add a further, admittedly more speculative, question: Given that opaque systems tend to disavow critical analysis—by way of legal and political inquiry, for example—can we understand this design logic as a conscious byproduct of the neocolonial ambition to appropriate knowledge without having to necessarily account for the responsibilities involved in archiving, quantifying, and applying it to real-world environments? (Fig. 9.4).

In outlining the extent to which colonial discourse laid the groundwork for the development and application of the apparatus of global surveillance technologies and other forms of technical representation, we can go some way to observing what a counterstrategy could look like, albeit with a significant caveat: the logic of colonial discourse was developed in corporeal terms (it was the human, fleshy eye that viewed, dissected, and reproduced the discursive realities of the non-Western world through representation). Today, in our post-digital age, that eye has given

way to the political economy of the remote machine eye and the recursive abstractions of "operational images." This development necessarily reframes how we can interrogate the applications of surveillance technology and what form the development of fit-for-purpose legislative action would subsequently assume in the context of human rights. Can we, that is to ask, prosecute an autonomous weapons system?³⁰ Working from within these implacable optical regimes, we might also want to ask whether we can frame a counterstrategy, or counter-operational-image, that would effect a transformation, legislative or otherwise, in the functioning of these systems?³¹

To investigate the potential to formulate a legally binding international human right in relation to airspace (and, perhaps more crucially, who exactly would be protected by such a right), projects such as *Topologies of Air* and the Airspace Tribunal do not concentrate a range of activities and enquiries but formally enquire into how we can effectively pose these questions and, momentously, through what means. How do we legislate for the production, dissemination, and reception of an epistemological apparatus—a system that produces knowledge and applies it—based on opaque "operational images" and a regime of "vision machines" that increasingly exist independent of human agency? How, that is to ask, do we witness the impact and effect of neocolonial technologies when they are deployed not only to target communities on the ground, so to speak, but also to elide any notion of a witness to both the execution and the event of violence?

²⁹For an in-depth discussion of the distinction between semi- and fully-automated weapons, see Paul Scharre, *Army of None: Autonomous Weapons and the Future of War* (New York: WW Norton and Company, 2019).

³⁰For a fuller discussion of what a counter-operational strategy could potentially entail in relation to the data sets used to train algorithms, see Trevor Paglen and Anthony Downey, "Algorithmic Anxieties," *Journal of Digital War* vol. 1 (2020): 18–28. See also, Anthony Downey, ed., *Trevor Paglen: Adversarial Hallucinations* (Sternberg Press/MIT, 2024).

²⁹Edward Said, "Facts, Facts, and More Facts," 27.



Fig. 9.4 Shona Illingworth, *Topologies of Air*, 2021. Video stills. Courtesy of the artist. Centre image, courtesy of Moesgaard Museum

Whereas colonization was, first and foremost, preoccupied with wealth and labor extraction through occupation, neocolonization pursues ever more clandestine forms of data extraction through surveillance. If we recall here, finally, Aimé Césaire's all-too-memorable phrase, "colonization=thingification," we can pinpoint the inherent processes of dehumanization practiced by colonial powers and how this, in turn, produced the docile and productive—that is, monetized and commodifiable—body of the colonized as a means to extract further "value" in the name of "progress" (the latter being a barely coded term for Western interests). As befits his time, Césaire understood these processes primarily in terms of wealth extraction (raw materials) and the exploitation of physical, indentured labor: "My turn to state an equation: colonization='thingification.' [...] I am talking about societies drained of their essence, cultures trampled underfoot, institutions undermined, lands confiscated, religions smashed, magnifi-

cent artistic creations destroyed, extraordinary possibilities wiped out."³²

Whereas colonization was first and foremost preoccupied with wealth and labor extraction through occupation, neocolonization, while furthering such ambitions, is indelibly implicated with forms of data extraction through surveillance that establishes and, increasingly, pre-determines if not controls the future. Both effect an epistemological and actual violence on communities and individuals, and both reveal the extractive technologies of imperialism. The line connecting the two involves the violence of knowledge and applied data. The exploitation of raw materials, labor, and people, effected through the violent proficiencies of Western power, was a process, as Césaire perspicaciously noted, of dehumanization that deferred, if not truncated, the quantum possibilities of future realities. And it is to those futures that the gaze

³²See Aimé Césaire, *Discourse on Colonialism* (New York: Monthly Review Press, 2000), 42–43.

of drones and satellite surveillance systems are being increasingly directed today. It is that gaze that will determine not only who occupies those futures but the ontological, if not increasingly phantasmagorical, distinction between life and death.

This chapter, slightly revised for publication here, was first published in Anthony Downey, ed., *Shona Illingworth: Topologies of Air* (London and Berlin: Sternberg Press and The Power Plant, 2022), 275–283. Shona Illingworth is a Danish–Scottish artist. Solo exhibitions of her work have taken place at The Power Plant, Toronto (2022);

les Abattoirs Museum, Toulouse (2022); Bahrain National Museum (2022); UNSW Galleries, Sydney (2016) and FACT, Liverpool (2015). Full credit for *Topologies of Air: Shona Illingworth, “Topologies of Air,” 2021, three-channel high-definition video and multi-channel sound installation, 45 minutes. Commissioned and funded by The Wapping Project, supported by Bahrain Authority for Culture and Antiquities, Sharjah Art Foundation, British Council, Arts Council England, and University of Kent. Images courtesy of the artist. Archive images courtesy of the Imperial War Museum, London, Moesgaard Museum, and NASA.*

Part III

Assembling and Representing: Artistic Perspectives on Volume, Vertigo, and Falling



Wassily Kandinsky and the Aerial Gaze: Questioning the Punctual, Linear and Planar Forces Inherent in the Politics of Visibility Conveyed by Police Drones

10

Francisco Klauser

Introduction

Camera-fitted drones are now easily affordable to the public. As remote, spatially articulated “vision machines” (Virilio, 2000), drones enable specific ways of watching and acting on the ground from and through the air. Due to the current societal proliferation of the technology, the drone-mediated aerial gaze is now ever-more widely distributed. Thus, drones break off the longstanding monopoly and privilege of the powerful to look on the ground from above (O Tuathail, 1996), spanning from the ancient emperors’ city walls and towers to the modern state’s satellites. The politics of visibility conveyed by the proliferating drone gaze adds a new chapter to the long history of the vertical gaze, adopted in order to understand, order, control and act on space (Dorrian & Pousin, 2013). Aerial power and power through the air become a social and a political issue in new ways (Adey et al., 2013; Williams, 2011a, 2011b).

This leads to an understanding of drones as aero-visual “techniques of power” in a Foucauldian sense (Foucault, 1982) that are fundamentally positional, that is occurring in specific sites in which their inherent socio-technical mediations unfold, and territorial, in that they

territorialize the objects and spaces made visible (Brighenti, 2010, p. 44). Thus the questions of where drones are being used, and where and how their gaze falls on the ground are never neutral, but revelatory of the specific politics of visibility conveyed. Concerned with this problematic, this chapter takes up the task of developing a spatial vocabulary that allows the exploration and questioning of the power issues arising from the spatial articulations of the drone’s aerial gaze as it falls on the ground. Exploratory and programmatic in style and ambition, this discussion draws upon Wassily Kandinsky’s theoretical engagements with the punctual, linear and planar forces inherent in and developing from differing graphic elements in abstract painting (Kandinsky, 1947).

In distinguishing between the three elementary graphic forms of points, lines and planes, Kandinsky aims at a discussion of the interacting punctual, linear and planar forces and logics inherent in, and developing from, the artistic composition of the space of painting, as a specific form of spatial practice. Likewise, the objective of the chapter is to capture and question the interacting forces and logics through which the drone-mediated aerial gaze today relates to and shapes the spaces of the everyday. This investigation also leads to a wider discussion of the terminological grounds on which to make sense of today’s IT-mediated encounters of visibility and space.

F. Klauser (✉)
Institute of Geography, University of Neuchâtel,
Neuchâtel, Switzerland
e-mail: francisco.klauser@unine.ch

More specifically, my argument that follows is structured into three main parts. Firstly, I discuss how the vocabulary of points, lines and planes is being used in existing social sciences, as well as in Kandinsky's theoretical work. Secondly, Kandinsky's terminological understanding is then applied to and illustrated through differing punctual, linear and planar logics of control conveyed by the drone gaze. Thirdly, I argue that the hence emerging spatial logics of control have to be understood as inherently flexible and interactive, rather than as static and isolated. This invites a broader investigation of the complementarities and tensions between differing spatialities of vision from above, relating to particular points in space as well as to wider spatial lines or planes, to fixity and movement, to enclosure and openness, and to spatial connections and separations.

Empirically speaking, this discussion combines two methodological approaches and datasets. On the one hand, it draws upon the qualitative in-depth case study of the air-bound expectations, imaginations and practices arising from the acquisition of a novel police drone in the Swiss canton of Neuchâtel (Klauser, 2021; Pedrozo & Klauser, 2022). On the other hand, I mobilize select results from a quantitative, large-scale survey conducted in 2017 among professional drone users in Switzerland (Pauschinger & Klauser, 2020).

Towards a Relational and Relativist Understanding of Points, Lines and Planes

As Olsson puts it, "all understanding involves crucial elements of translation, of movement from one conceptual world to another. Thus, all understanding is by necessity metaphoric, for I must always grasp what I wonder about as something different" (1982, p. 223). Such is also my basic posture in the discussion that follows. Reflecting Olsson's stance that metaphors are indispensable in the production of knowledge and understanding, and taking on board the arguments advanced for reflecting critically upon the meanings imported by the deployed terms into

the conceptions they construct (Simonson, 2004; Smith & Katz, 1993), my discussion of points, lines and planes in connection with the politics of visibility conveyed by drones aspires to open up a more reflexive and critical use of the terms.

Points, Lines and Planes in Existing Social-Scientific Literatures

The terminological register of points, lines and planes has long run through space-sensitive social-scientific literatures, mobilized as a basic spatial vocabulary through which to make sense of the world. Hereby, the terms are approached in both mathematical and metaphorical ways, although the invoked meaning systems are barely explained in either case.

On the one hand, mathematical uses of the terminology are predominant in quantitative social-scientific approaches, and especially in spatial analysis. In relevant literatures, points, lines and planes are deployed as a formal lexicon that translates reality into a geometric language, with a view to the quantification, calculation and modelling of its basic elements and patterns (Simonson, 2004, p. 1336). Heavily criticized from the 1970s for the "violence of abstraction" (Barnes, 2011, p. 387) inherent in its formalist and reductionist approach (Gregory, 1978; Olsson, 1982; Raffestin, 1989), spatial analysis and its mathematical understanding of points, lines and planes has since evolved further, especially in the field of geographic information science (Goodchild & Haining, 2004, p. 363; Barnes, 2011, p. 389).

On the other hand, the terminology of points, lines and planes has been used in more metaphorical ways. For example, the vocabulary of points, lines and planes, together with derived notions such as networks, rings and circles, is present heavily in contemporary engagements with the spatial dimensions of surveillance and control, although a lack of explicit reflection on the terms' meanings and implications also persists in this field. Scholars are exploring the logics and effects of surveillance and security operations relating to spatial nodes and passage points (Castells, 1996;

Fuller, 2002; Graham, 2010), different kinds of infrastructural networks (Coaffee & Murakami Wood, 2006; Debrix, 2001; Gorman, 2005; Wekerle & Jackson, 2005), security rings and circles (Coaffee, 2004), border lines (Franzén, 2001) and wider risk areas (Koskela, 2000). Furthermore, also consider Weizman's (2004) analysis of the geometries of military occupation and November (2002) engagement with the punctual, linear and planar spatial logics of risks. Criticism has focused on the lack of explicit reflection with regard to the politics and wider space conceptions conveyed by the terminology (Smith & Katz, 1993) and on the implied dangers of simplification, formalism and essentialism. Yet this criticism has not, or at least very rarely, called into question the very use of (geometric) metaphors per se.

Points, Lines and Planes in Abstract Painting

In reaction to these literatures, there are two main reasons accounting for my interest in Kandinsky's engagement with points, lines and planes. Both are worth outlining, before moving on to discuss the punctual, linear and planar spatial logics inherent in the politics of visibility conveyed by drones.

The first reason for my interest in Kandinsky's approach to points, lines and planes lies in the painter's basic ambition, which presents a series of interesting parallels with my own endeavour. In distinguishing between the three elementary graphic forms, Kandinsky aims at a discussion of the interacting punctual, linear and planar forces and logics inherent in, and developing from, the artistic composition of the space of painting, as a specific form of spatial practice. The two paintings made by Kandinsky, which I have included in the chapter's appendixes (Figs. 10.1 and 10.2), provide powerful testimony thereof. Points, lines and planes are thereby approached not as incorporeal mathematical abstractions, but as differing forms of extension that necessarily assume a certain proportion when used in painting (Kandinsky, 1947, p. 28).

Likewise, the present chapter invites exploration of the punctual, linear and planar logics and forces inherent in the spatially articulated drone gaze. Channelled through the terminology of points, lines and planes, my aim is to capture some of the interacting forces and logics through which drones today relate to and shape the spaces of the everyday. In this view, it is worth outlining in more detail the specific forces and characteristics that Kandinsky associates with points, lines and planes, so as to operationalize the terms for my analytical purposes. To start, I first consider Kandinsky's approach to points:

The point is a small world cut off more or less equally from all sides and almost torn out of its surroundings. ... It maintains itself firmly in place and reveals not the slightest tendency to movement in any direction whatsoever, either horizontal or vertical. Furthermore, it neither advances nor recedes. Only its concentric tension discloses its inner kinship with the circle—while its further characteristics rather point to the square. The point digs itself into the plane and asserts itself for all time. Thus it presents the briefest, constant, innermost assertion: short, fixed and quickly created. (Kandinsky, 1947, p. 32)

Associating points with fixity, restraint, concision, self-containment and rest, Kandinsky's approach to the term is of interest for the study of the drone gaze in that it allows one to capture figuratively the logics of fixing and singling out objects or locations for purposes of stable and inherently undifferentiated control.

Lines, in turn, are considered by Kandinsky as graphic elements that result from the point that sets itself in motion, as the "track made by the moving point" (Kandinsky, 1947, p. 57). As such, lines are associated with movement, dynamism, direction and connection, but also with the separation of and contrast between planes (the line as spatially articulated limit) (Kandinsky, 1947, p. 65). In this reading, lines are both dividers between planes and connectives between points (Jensen & Olsson, 2012, p. 322). In turn, a focus on the linear spatial logics of surveillance invites consideration of how drones relate to both boundedness and separation, and connectivity and movement. Drone usage for purposes of border

Fig. 10.1 Painting by V. Kandinsky: Delicate Tension

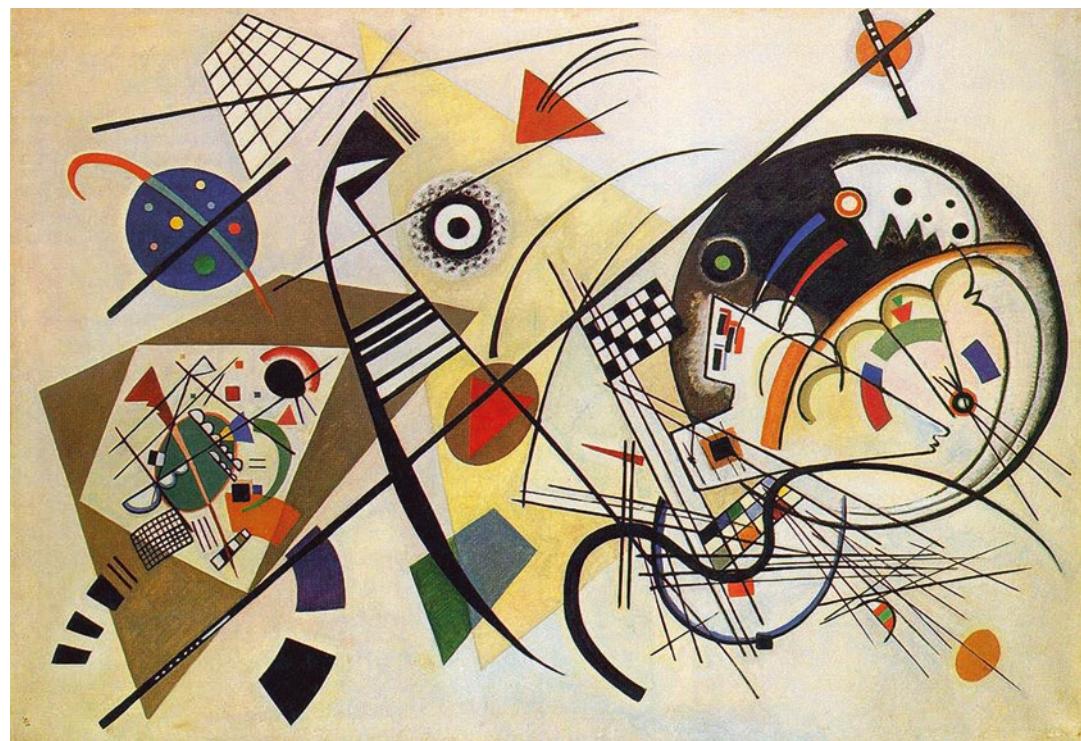
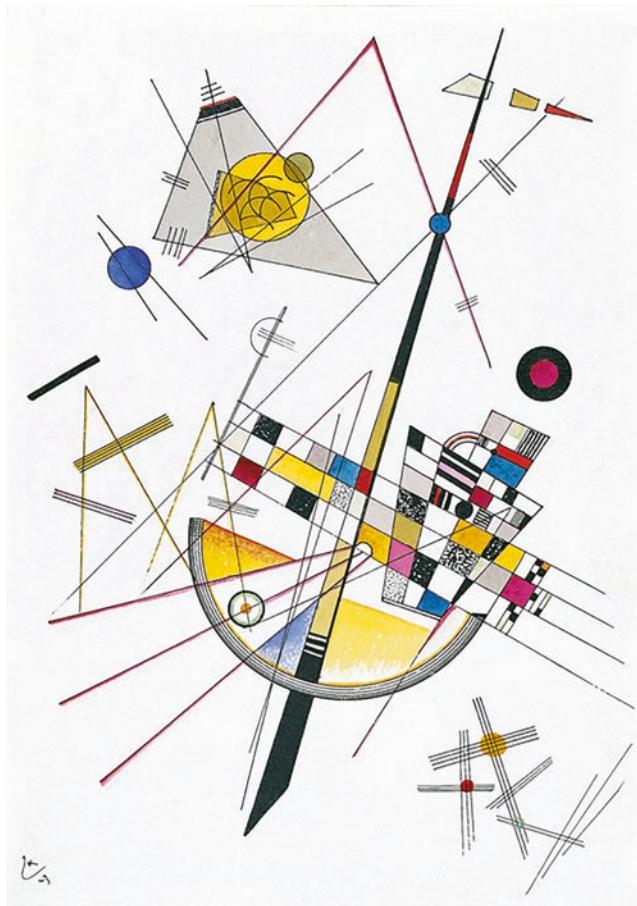


Fig. 10.2 Painting by V. Kandinsky: Transverse Line (1923)

control and the management of traffic flow, for example, are relevant examples at hand.

Planes, finally, are conceived by Kandinsky as “activated surfaces” that owe their origin either to the centrifugal forces of the “growing point” or “rotating line” (Kandinsky, 1947, p. 60), or to the centripetal and binding impulse innate in the encounter of intersecting linear formations (Kandinsky, 1947, p. 72, 82). All three processes of plane formation can also be discussed from a viewpoint centred on the drone gaze, as shown in my discussion below.

The second reason accounting for my interest in Kandinsky’s “theories of composition” (Kandinsky, 1947, p. 35) lies in the painter’s relativist and relational approaches to points, lines and planes. The following quote is illustrative thereof:

Externally, the point may be defined as the smallest elementary form, but this definition is not exact. It is difficult to fix the exact limits of the concept ‘smallest form’. The point can grow and cover the entire ground plane unnoticed—then, where would the boundary between point and plane be? There are two considerations to be borne in mind here: 1. the relation of the size of the point to the size of the plane, and 2. the relative sizes of the point and of the other forms on this plane. (Kandinsky, 1947, p. 29)

The quote demonstrates that Kandinsky conceives the forces inherent in and developing from differing graphic elements not in isolation, but in their reciprocal constitution and effects. What matters is not the essence of any particular form, but the relational effects (in terms of harmony, tension, rhythm, etc.) induced by the combination of and interactions between punctual, linear and planar forms and forces of artistic space production. Thus, Kandinsky foregrounds the need to approach the three elements in their connecting and intermingling, yet also contrasting and conflicting, associations. This stance allows the study of the reciprocal spatial logics conveyed and effects induced by differing techniques of surveillance. Below, I develop precisely such an analysis by studying the interacting punctual, linear and planar logics of the drone’s aerial gaze.

Furthermore, the above quote testifies to Kandinsky’s fundamentally relativist approach to

points, lines and planes. From the viewpoint of the spatial practices of abstract painting, the three elements cannot be distinguished clearly, or in any numerically expressible way. Rather, Kandinsky’s focus is on their relational positioning and relative proportions. Thus, there are no absolute categorical boundaries that separate points, lines and planes (Kandinsky, 1947, p. 29). For my purposes, it follows that punctual, linear and planar spatial logics of surveillance differ in degree rather than in kind. Paraphrasing Kandinsky (1947, p. 90), the question “When do punctual or linear logics of vision and visibility die out, and at what moment are planar logics born?” remains without a definite answer.

Punctual Linear and Planar Forces Inherent in the Drone Gaze

Fitted with imaging capabilities, drones are intrinsically bound up with space. They combine various geographical scales and spatial logics of vision and visualization from above and afar; they offer flexible and mobile ways of monitoring, following and orchestrating flows of people and objects on the ground; and they allow the administration of wider areas and border regions. It follows that the drone gaze is in practice highly specific and selective, focusing on some portions of space rather than on others, which in turn produces novel forms of spatial differentiation and hierarchization. This underlines that if we are to understand the spatial articulations of the drone gaze, we need to place centre stage the actors and interests that mediate specific drone practices and thus motivate specific spatial logics of visibility and visualization.

In addressing and questioning the drones’ spatially articulated gaze, scholars have inscribed drones in the long history of the view from above, which reaches from aerial photography in archaeology to surveillance and bombing in warfare (Hough, 2013; Zaloga, 2008), and from the aerial policing of mega cities (Herbert, 1996; Adey, 2010a) to the top-down visualities of aerial survey, photographic reconnaissance, remote sensing, satellite telemetry and GIS (Crampton,

(2007). This work opens up a wide field of investigations into the evolutions, logics and power dynamics that characterize different modes of technologically mediated vision and visualization from above (Adey, 2010a). It also connects with wider efforts, especially in critical geopolitics, to problematise the rationalities, normative agendas and “violent epistemologies” (Adey et al., 2013) inherent in the geo-graphing of the world from above (O Tuathail, 1996).

Punctual Logics of Vision

Drones convey a punctual spatial logic of vision if they remain stable in the air, immutable and devoid of any zooming features, thus implying a fixed gaze from above that singles out particular locations for sustained, contained and undifferentiated photographing and/or filming. The purpose of such drones is to focus on specific portions of space that are of particular interest. Hereby, the drone user’s relationship with space is reduced to a pragmatically defined minimum.

By way of example, consider the following quote—taken from an interview conducted in 2016 with a police officer at Neuchâtel Police in Switzerland—relating to drone usage for purposes of aerial photography of traffic accidents.

Drones offer an aerial perspective that shows the situation truly as it is [as opposed to the distorting view of cameras on the ground or imprecisions of eyewitnesses’ accounts]. For this, there must be stability in its [the drone’s] position and altitude. [...] Gyroscopes will compensate for the strength of the wind so as to maintain the drone’s position. That’s what makes the strength of this model. We can take pictures with up to 40 kilometres per hour of wind and we can still fly with up to 50 kilometres per hour of wind. That’s quite enormous for this kind of machine. (Traffic Security Unit, 28.6.2016)

The quote is of interest for different reasons. For one, it illustrates the “epistemology of truth” conveyed by the drone’s fixed aerial gaze. The drone is portrayed as a window on reality, intrinsically bound up with space, that shows the traffic accident truly as it is. Mirroring Kandinsky’s terminological understanding of the “point”, the

drone’s gaze here “digs itself into the plane and asserts itself” (Kandinsky, 1947, p. 32), it produces a “small world cut off more or less equally from all sides and almost torn out of its surroundings” (*ibid.*).

As argued initially, what matters in Kandinsky’s understanding of the point is the specific force it conveys, which—just as in the example at hand—is one of fixity, concision and singularization of a specific portion of space that is set apart from its surrounding [here: for forensic analysis of the accident’s logic and structure]. This portion of space [here: the location of the road accident] is not necessarily of circular shape. As Kandinsky stresses, “in its material form, the point can assume an unlimited number of shapes: it can become jagged, it can move in the direction of other geometric forms, and finally develop into entirely free shapes” (Kandinsky, 1947, p. 31). By analogy, the drone’s punctual logic of vision can be modulated and extended, thus conveying a more planar force, if the camera operators sweep the zone, zoom out, or if additional police patrols are deployed on the spot. Thus, there is also an important parallel with Kandinsky’s understanding of the relative nature of the graphic forms in abstract painting. As Kandinsky puts it, “the point clawing its way into the plane is also able to free itself from the plane and to ‘float’ in space” (Kandinsky, 1947, p. 145).

Second, the above quote is of interest in that it inscribes the drone’s punctual gaze within its aerial, that is, volumetric context. More specifically, the account sets two types of agency into relation with each other: the drone’s software-mediated ability to fix and stabilize its position and subsequent punctual gaze, and the air’s “animate agency” (McCormack, 2008, p. 415) that unsettles the technology’s compensating efforts. Thus, if the drone’s punctual—that is fixed, concise and singularizing—gaze is portrayed as a condition of truth, it is also seen as a technical challenge. This not only testifies to the intrinsic relation between the drone’s gaze as it falls on the ground and its aerial origin, but also exemplifies how space itself (as an aerial-elemental volume) mediates the very exercise of the spatial logics of vision and visualization conveyed. In this sense,

the quote also testifies to the inherent positional-
ity of the drone gaze and, more generally put, to
the intrinsic connection between the air and the
ground. As Peter Adey maintains, “both the
ground and the air reside together in vertical recip-
rocity” (Adey, 2010b, p. 3).

It would be possible, I trust, to take these observations as a starting point to move beyond Kandinsky’s two-dimensional graphic vocabulary, to develop a properly volumetric language, aimed at grasping, both theoretically and terminologically, the intrinsic volumetric complexities of the studied realities. Elsewhere, I have offered such a volumetric analysis of the drone’s encounter with the air (Klauser, 2021). Here, my problematic is a different one, focusing more specifically on the spatial articulations of the drone’s gaze as it falls on the ground. In this endeavour, my present task is to show the analytically heuristic potential offered by Kandinsky’s vocabulary, without however forgetting its unavoidable limits and problems.

Linear Logics of Vision

The drone’s punctual logic of vision can also be enlarged to wider spatial lines, if the drone’s gaze is set into movement (Cogarty & Hagger, 2008; Graham & Hewitt, 2013). Indeed, the drones’ ability to move is often placed centre stage in promotional discourses, which stress the operational advancements of the aircrafts, with reference to their abilities to fly higher, further and for a longer time (Wall & Monahan, 2011). Interestingly, as shown in a large-scale survey conducted among public and private drone users in Switzerland (Pauschinger & Klauser, 2020), 88% of drone users reject the idea that they could use a fixed camera on the ground instead of a drone. This result substantiates the relevance of Jensen’s claim for a framing of the drone problematic through the “mobilities turn” paradigm, so as to foreground how drones relate to, embrace and manage everyday-life mobilities (Jensen, 2016).

By way of example, consider the use of drones for the monitoring of moving people and objects

around and across national borders (Williams, 2007). In Switzerland, border guards have used drones to monitor the national borders since 2001 (Pedrozo, 2017). Importantly, as Pedrozo shows, this type of drone usage implies a twofold linear logic of surveillance. On the one hand, drones are being used to patrol, that is follow the national border, whilst on the other hand, they allow the monitoring of border-crossing flows (of pedestrians, cars, etc.) as they move into the national territory. The emerging system of separating and conductive lines of visibility stands for a logic of control that aims at the management of circulations along the country’s circumscription, but also along the very circuits where groups and individuals move.

Again, Kandinsky’s understanding of the forces developing from differing graphic forms in abstract painting proves useful if we are to grasp the intentions behind and forces developing from the drone’s moving gaze. As argued previously, Kandinsky stresses the intrinsic connection between the line and the idea of movement, which connects neatly with my focus on the mobile spatial articulations of the drone gaze. By definition, as Kandinsky stresses, “it [the line] is the track made by the moving point; that is, its product. It is created by movement—specifically through the destruction of the intense self-contained repose of the point. Here, the leap out of the static into the dynamic occurs” (Kandinsky, 1947, p. 57). Kandinsky sees the line as a graphic form that expresses a force that implies a certain dynamism and direction. This resonates strongly with the patrolling, following and channelling aerial gaze of the border-control drone.

Second, it must be reiterated that Kandinsky’s emphasis on the line as movement centres on an understanding of differing graphic forms not as an incorporeal mathematical abstractions, but as forms of extension that necessarily assume a certain proportion when used in abstract painting. This emphasis is relevant for our understanding of the politics of visibility conveyed by drone usage for purposes of border control. Indeed, the aerial gaze as it falls on the ground necessarily covers a certain stretch of land, which can also (and does also) reach beyond the Swiss national

border line. In interviews conducted with Swiss border guards, during a one-night long observation of their drone usage (12 May 2015), the fact that the drone(s) border-screening between Switzerland and France necessarily reaches into both national territories was described to raise a range of critical issues in terms of national sovereignty and control of territory.

Third, the case at hand leads back to Kandinsky's claim that the graphic forms used in abstract painting must be set and seen in interaction. More specifically, the example of drone usage for border control illustrates powerfully the intertwined logics of enclosing and delimiting space on the one hand, and of managing, guaranteeing and following circulations between enclosures or passage points on the other. Whilst my quick discussion here is related only to the intertwined linear spatial logics of control, in reality—as we shall see in the last section of my chapter—this discussion can also be opened to the interactions between punctual, linear and planar spatial logics of vision more broadly.

Planar Logics of Vision

Drones can also be used for monitoring wider planes. Mirroring Kandinsky's understanding of the term, the main criterion here is not only one of scale, but also one of inherent differentiation. Planar logics of surveillance—as with planar forms in abstract painting—are open to internal differentiation in terms of varying intensities, specific focal points or centres of gravity. Potentially, planar forms of surveillance may thus also incorporate other spatial logics of control within their contours. For example, particular points in space might be subject to heightened monitoring within controlled zones through zooming in or additional surveillance devices. This illustrates the spatial logic of surveillance to select, monitor, differentiate, arrange and administer specific portions of space, without according the same type of attention to the whole territory.

It is interesting to discuss from the viewpoint of the drone gaze the three processes of plane formation outlined above. Firstly, the formation of

planes from the “growing point”, as Kandinsky puts it, finds analogous expression in the case of drone cameras zooming out from specific locations in order to monitor wider zones of interest. Secondly, the planar spatial logics of control developing from rotating cameras may be considered as an illustration of plane formation resulting from the “rotating line”. Thirdly, planar effects of surveillance can also be obtained by intersecting or adjoining linear logics of drone usage, for example by systematically sweeping specific zones as if painting a wall by a roller.

The resulting planar spatial logics of vision are conditioned by the drones' flight altitude, reach and autonomy, by their mobility or fixity in the air, and by the cameras' technical features (type of camera, zoom, angle of vision, etc.). Consider the following quote, taken from another interview with Neuchâtel police—here with its forensic service—relating to the use of drones above major house fires.

We are so used to enter [the house on fire]. We'd have to readapt, to learn what to look for. [having a drone] would help be more relevant and focused [...] It's all about the relevance of our searches and ultimately also about time saving. But I don't think a drone could see everything. There'd still have to be people on the ground going on the spot, to be sure. [...] If there's some trees, I'm not sure it [the drone] could see well everywhere. (Forensic Science Unit, 16.6.2016)

Interestingly, the interviewee here refers not only to the drone's capacity to provide a large-scale, that is, planar overview of the situation on the ground, but also underlines the need for further, more specific, internal surveillance and differentiation of the house on fire. This leads back to Kandinsky's understanding of plane formation through scalar modulation and internal differentiation. Furthermore, the quote underscores that despite the drone's seemingly unhindered and easily adaptable gaze that allows the operators to “see a multiplicity of renderings of the area targeted” (Williams, 2011a, p. 386), drones are in no way omni-seeing, but rather follow specific spatially articulated logics of vision and control. These in turn reflect the technical capabilities, the underpinning interests and the multiple coalitions

of authority and expertise through which the systems are co-produced (Adey et al., 2011). In the case at hand, whilst the drone is praised as a tool for more focused and relevant intervention, it is also seen to have its own limits and thus inscribed within a wider dispositif of policing. Regarding the problematic of visibility, in particular, this underscores the complementarity of differing tools and positions of vision offered by drones and human actors on the ground, for example.

Flexible and Interacting Spatial Logics of Vision

From the preceding discussion, two main aspects arise, both of which invite a discussion that moves beyond a separate focus on the punctual, linear and planar spatial logics of vision and visualization conveyed by the drone gaze, to focus instead on how these spatial logics of visibility are being modulated and combined.

On the one hand, the examples discussed highlight the inherent spatial flexibility of the drone gaze. For example, drones allow the monitoring of multiple places simultaneously, on different geographical scales by means of a zoom lens and by combining different spatial logics, such as (1) the continuous observation of mobile objects by following the object in the air or of fixed connections and separations by flying above transport networks or national borders for example, (2) the fixed monitoring of particular sites (buildings, nodal points) or (3) the zonal surveillance of diffuse phenomena through continuous sweeping. This spatial flexibility can be further extended through the integration of additional sensors or software (Wall & Monahan, 2011) and by incorporating drones within wider network-centric forms of policing (Graham, 2010). In existing literatures, the drones' ability to adapt, both functionally and spatially speaking, is often described to lay at the very heart of their current and future development (Philippens, 2013), and should thus be placed centre stage in future research on the topic. This connects neatly with Kandinsky's focus on the interacting logics and reciprocal effects induced by the combination of

differing punctual, linear and planar forms and forces of artistic space production, in both their associations and tensions.

On the other hand, the examples discussed invite a focus on the spatial logics of visibility conveyed by the drone in interaction with other spatially articulated techniques of visibility and control. For example, as shown elsewhere in more detail (Klauser, 2017), the deployment of drones above three Swiss cities during the European Football Championships in 2008 was bound up intrinsically with the monitoring of the event cities by surveillance cameras and roaming police patrols. Here, differing techniques were combined precisely because of their complementary punctual, linear and planar spatial logics of surveillance (Klauser, 2013).

This underscores that order to understand how the drone gaze territorializes space, and the specific power dynamics this produces, different forms and logics of spatially articulated vision must be considered in their interactions. In graphic terms, this invites an understanding of the spatial logics of vision that are fundamentally intertwined and mutually beneficial, relating to fixity and mobility, punctual, linear and planar logics and articulations simultaneously.

Conclusion: Thinking Beyond Points, Lines and Planes

Much more could be said about the politics of visibility conveyed by drones. Here, my key point merely was to elucidate the inherently spatial, yet also fundamentally intertwined logics of vision and visualization from above they convey, and, more specifically, to illustrate the usefulness of the vocabulary of points, lines and planes as approached by Wassily Kandinsky, to develop that argument. The vocabulary offers an initial understanding of the functioning of surveillance in this particular area of application, which provides a good basis for further investigation through other terms and metaphors.

It also goes without saying that there are many examples of other technologies that could lead to a discussion of surveillance in its punctual, linear

and planar spatial logics. For example, it would be particularly interesting to explore the interactions between, and complementarity of, differing forms of visual surveillance of space by CCTV cameras, drones and satellites. Furthermore, it would be possible to study, for example, the punctual, linear and planar logics of surveillance conveyed by radio frequency identification (RFID) chips in tickets and goods, from punctual passage controls at RFID checkpoints to more linear and planar logics of tracking and geo-localization. Alternatively, further investigation could cover sensor-based infrastructure protection (as a way of monitoring lines through aligned points of control) or GIS (as a mode of monitoring and administering spatial distributions of people and things across space) (Crampton, 2007). Thus, there is clearly much more to be done to extend the discussion I set forth above. In this view, I want to end here with three notes of caution, which also lead back to my initial discussion of Kandinsky.

Firstly, it should be reiterated that my insistence on the parallels between my own ambition and Kandinsky's endeavour—pointing at the punctual, linear and planar forces inherent in both surveillance and abstract painting—by no means implies any congruency with regard to the realities approached or methods deployed. On the contrary, the respective target domains for the application of the point–line–plane taxonomy present a series of important gradual and fundamental differences that call for careful scrutiny. For a start, the space of abstract painting is two-dimensional and fixed, whereas the socio-spatial reality of surveillance is inherently multidimensional and dynamic. Crucial differences can also be seen on the levels of visibility (as punctual, linear and planar forces are discerned in different ways in each case), the implied productive processes (as the space of painting is created by an individual artist, whereas the socio-spatial realities of surveillance reflect a multiplicity of productive agents and forces), referentiality (since abstract painting reflects moods and feelings, whereas surveillance is mediated by specific intentions of control) and, therefore, politics. Moreover, while it is possible to speak in both cases of

forces that express themselves spatially, it should be kept in mind that very different things are meant by this. For Kandinsky, “forces” refer to the artists’ creative capacities and to the paintings’ affective effects. In the field of surveillance, they refer to the systematic control and structuring of people’s actions. Thus, although Kandinsky’s understanding of points, lines and planes offers inspiring insights that help operationalize the terms for studying surveillance in its spatial logics, caution is very much in order in transposing the terminology from one field of study to another.

My second warning concerns the risk of overstressing the distinctiveness of differing spatially articulated forces inherent in contemporary surveillance when approaching these through metaphors such as points, lines and planes. This risk is attenuated in approaching the terms from a relational and relativist viewpoint, as suggested by Kandinsky. Yet it is important to remember that, in reality, punctual, linear and planar forces of surveillance express themselves in fundamentally messy, intertwined and contingent ways. The terms are approached here merely as metaphors that stand for a range of ideal-typical forces inherent in contemporary surveillance practices and techniques: fixity, concision, containment and rest (points); contrast and separation, connectivity and movement (lines); and inherent activation, differentiation and boundedness (planes).

Thirdly, it is worth recalling that this chapter focuses exclusively on how surveillance is articulated spatially, and not on how it is lived and perceived by users of affected spaces. The latter question has been addressed by a growing body of academic literature in recent years, which highlights that surveillance is experienced in varying and often unexpected ways. Thus, the spatial logics of surveillance described above are not necessarily lived as such in everyday life.

In sum, metaphors are truly unavoidable to make sense of the world, as stated initially, but also unavoidably problematic, in that they imply but one meaning system for making sense of a reality that is indeed, and luckily, much more complex than what they allow to grasp.

Acknowledgment The chapter draws upon and further develops from a drone-specific perspective a more general discussion of the punctual, linear and planar logics of surveillance, drawing upon Kandinsky theoretical work, developed in Klauser, 2017.

References

- Adey, P. (2010a). Vertical security in the megacity: Legibility, mobility and aerial politics. *Theory Culture & Society*, 27(6), 51–67. <https://doi.org/10.1177/0263276410380943>
- Adey, P. (2010b). *Aerial Life*. Wiley Blackwell.
- Adey, P., Whitehead, M., & Williams, A. J. (2011). Introduction: Air-target: Distance, reach and the politics of verticality. *Theory, Culture & Society*, 28, 173–187.
- Adey, P., Whitehead, M., & Williams, A. J. (2013). *From above: War, Violence, and verticality*. Hurst Publishers.
- Barnes, T. J. (2011). Spatial analysis. In J. Agnew & D. Livingstone (Eds.), *Handbook of geographical knowledge* (pp. 380–391). Sage.
- Brightenti, A. (2010). *Visibility in social theory and social research*. Palgrave Macmillan.
- Castells, M. (1996). *The information age: Economy, society and culture, vol. 1: The rise of the network society*. Blackwell.
- Coaffee, J. (2004). Rings of steel, rings of concrete and rings of confidence: Designing out terrorism in central London pre and post September 11th. *International Journal of Urban and Regional Research*, 28(1), 201–211. <https://doi.org/10.1111/j.0309-1317.2004.00511.x>
- Coaffee, J., & Murakami Wood, D. (2006). Security is coming home: Rethinking scale and constructing resilience in the global urban response to terrorist risk. *International Relations*, 20(4), 503–517. <https://doi.org/10.1177/0047117806069416>
- Cogarty, B., & Hagger, M. (2008). The laws of man over vehicles unmanned: The legal response to robotic revolution on sea, land and air. *Journal of Law, Information and Science*, 19, 73–145.
- Crampton, J. W. (2007). The biopolitical justification for geosurveillance. *Geographical Review*, 97(3), 389–403. <https://doi.org/10.1111/j.1931-0846.2007.tb00512.x>
- Debrix, F. (2001). Cyberterror and media-induced fears: The production of emergency culture. *Strategies: Journal of Theory, Culture & Politics*, 14(1), 149–167. <https://doi.org/10.1080/10420130120042415>
- Dorrian, M., & Pousin, F. (Eds.). (2013). *Seeing from above: The aerial view in visual culture*. IB Tauris.
- Foucault, M. (1982). The subject and power. *Critical Inquiry*, 8(4), 777–795.
- Franzén, M. (2001). Urban order and the preventive restructuring of space: The operation of border controls in micro space. *Sociological Review*, 49(2), 202–218. <https://doi.org/10.1111/1467-954X.00252>
- Fuller, G. (2002). The arrow—Directional semiotics: Wayfinding in transit. *Social Semiotics*, 12(3), 131–144. <https://doi.org/10.1080/10350330216376>
- Goodchild, M. F., & Haining, R. P. (2004). GIS and spatial data analysis: Converging perspectives. *Papers in Regional Science*, 83(1), 363–385. <https://doi.org/10.1007/s10110-003-0190-y>
- Gorman, S. (2005). *Networks, security and complexity: The role of public policy in critical infrastructure protection*. Edward Elgar.
- Graham, S. (2010). *Cities under Siege: New military urbanism*. Verso.
- Graham, S., & Hewitt, L. (2013). Getting off the ground: On the politics of urban verticality. *Progress in Human Geography*, 37(1), 72–92. <https://doi.org/10.1177/0309132512443147>
- Gregory, D. (1978). *Ideology, science and human geography*.
- Herbert, S. (1996). The geopolitics of the police: Foucault, disciplinary power and the tactics of the Los Angeles police department. *Political Geography*, 15(1), 47–59. [https://doi.org/10.1016/0962-6298\(95\)00004-6](https://doi.org/10.1016/0962-6298(95)00004-6)
- Hough, K. (2013). Aerial torpedoes, buzz bombs, and predators: The long cultural history of drones. *Origins*, 6. Retrieved August 29, 2022, from https://origins.osu.edu/article/aerial-torpedoes-buzz-bombs-and-predators-long-cultural-history-drones?language_content_entity=en
- Jensen, O. E. (2016). Drone city—Power, design and aerial mobility in the age of “smart cities”. *Geographica Helvetica*, 71, 67–75. <https://doi.org/10.5194/gh-71-67-2016>
- Jensen, O. E., & Olsson, G. (2012). Mappa mundi universalis. In C. Abrahamsson & M. Gren (Eds.), *On the geographies of Gunnar Olsson* (pp. 313–332). Ashgate.
- Kandinsky, W. (1947 [1926]). *Point and line to plane*. Cranbrook Press.
- Klauser, F. (2013). Spatialities of security and surveillance: Managing spaces, separations and circulations at sport mega events. *Geoforum*, 49, 289–298. <https://doi.org/10.1016/j.geoforum.2012.11.011>
- Klauser, F. (2017). *Surveillance and space*. Sage.
- Klauser, F. (2021). Policing with the drone: Towards an aerial geopolitics of security. *Security Dialogue*, Online early view.
- Koskela, H. (2000). The gaze without eyes: Video-surveillance and the changing nature of urban space. *Progress in Human Geography*, 24(2), 243–265. <https://doi.org/10.1191/030913200668791096>
- McCormack, D. (2008). Engineering affective atmospheres on the moving geographies of the 1897 Andrée expedition. *Cultural Geographies*, 15(4), 413–430. <https://doi.org/10.1177/1474474008094314>
- November, V. (2002). *Les Territoires du Risque. Le Risque comme Objet de Réflexion Géographique*. Peter Lang.
- O Tuathail, G. (1996). *Critical geopolitics*. Routledge.
- Olsson, G. (1982). *Lines of power: Limits of language*. University of Minnesota Press.

- Pauschinger, D., & Klauser, F. (2020). Aerial politics of visibility: Actors, spaces and drivers of professional drone usage in Switzerland. *Surveillance and Society*, 18(4), 443–466. <https://doi.org/10.24908/ss.v18i4.13434>
- Pedrozo, S. (2017). Swiss military drones and the border space: A critical study of the surveillance exercised by border guards. *Geographica Helvetica*, 72, 97–107. <https://doi.org/10.5194/gh-72-97-2017>
- Pedrozo, S., & Klauser, F. (2022). Between formality and informality: A critical study of the integration of drones within the Neuchâtel police force. *Information Polity*, 27, 247–258.
- Philippens, H. (2013). *Drones and deterrence: How robotics will impact strategic stability. report*. Royal United Services Institute, 1–12.
- Raffestin, C. (1989). *Théories du réel et géographie*. *EspacesTemps*, 40(41), 26–31. <https://doi.org/10.3406/espat.1989.3454>
- Simonson, K. (2004). Networks, flows, and fluids—Reimagining spatial analysis? *Environment and Planning A*, 36(8), 1333–1338. <https://doi.org/10.1068/a3608com>
- Smith, N., & Katz, C. (1993). Grounding metaphor. In M. Keith & S. Pile (Eds.), *Place and the politics of identity* (pp. 67–83). Routledge.
- Virilio, P. (2000). *The information bomb*. Verso.
- Wall, T., & Monahan, T. (2011). Surveillance and violence from afar: The politics of drones and liminal security-scapes. *Theoretical Criminology*, 15(3), 239–254. <https://doi.org/10.1177/1362480610396650>
- Weizman, E. (2004). Strategic points, flexible lines, tense surfaces, political volumes: Arial Sharon and the geometry of occupation. *The Philosophical Forum*, 35(2), 221–244. <https://doi.org/10.1111/j.0031-806X.2004.00171.x>
- Wekerle, G. R., & Jackson, P. S. B. (2005). Urbanizing the security agenda: Anti-terrorism, urban sprawl and social movements. *City*, 9(1), 33–49. <https://doi.org/10.1080/13604810500050228>
- Williams, A. J. (2007). Hakumat al Tayarrat 1: The role of air power in the enforcement of Iraq's boundaries. *Geopolitics*, 12(3), 505–528. <https://doi.org/10.1080/14650040701305690>
- Williams, A. J. (2011a). Enabling persistent presence? Performing the embodied geopolitics of the unmanned aerial vehicle assemblage. *Political Geography*, 30(7), 381–390. <https://doi.org/10.1016/J.POLGEO.2011.08.002>
- Williams, A. J. (2011b). Reconceptualising spaces of the air: Performing the multiple spatialities of UK military airspaces. *Transactions of the Institute of British Geographers*, 36(2), 253–267. <https://doi.org/10.1111/j.1475-5661.2010.00416.x>
- Zaloga, S. (2008). *Unmanned aerial vehicles: Robotic air warfare 1917–2007*. Osprey Publishing.



After Falling Away: Reflections on a Vertiginous Art Exhibition

11

Davide Deriu

The rise of vertical cities gives form to the contradictions of late-capitalist societies, torn as they are between the imperatives of economic growth and an impending ecological breakdown. At times of deep instability, high-rise architecture lays bare this conundrum. Not only do tall buildings manifest the conquest of urban skies that has been unabating since the late nineteenth century, spreading in recent decades across ever-larger swathes of the urbanised world; they also embody what might be called the paradox of verticality. While the construction of towers has historically been related to positions of power—whether in terms of politics, social status, or corporate visibility—at the same time it is involved in the production of spaces that are fraught with fears and anxieties.

The urban abyss has become inextricably bound up with the experience of modernity since the advent of skyscrapers; yet, in recent decades, the process of vertical urbanisation has taken up a global dimension. How do we understand the vertiginous spaces of our cities? What critical and creative responses are elicited by built environments that challenge our perception of balance? These are some of the questions that animate the *Vertigo in the City* project, a collab-

orative initiative based at the University of Westminster's School of Architecture and Cities which involves scholars and practitioners from a diverse range of sciences, arts and humanities. Recognising the growing concern with verticality that has emerged within urban research (Graham, 2016; Graham & Hewitt, 2013; Harris, 2015), this project interrogates the impact of built environments on our sensory and emotional lives by focusing on vertigo, a complex phenomenon that is approached in various ways within different disciplines.

Anxiety and pleasure are the emotional poles that define the spectrum of vertigo in psychoanalytical terms (Quinodoz, 1997). This feeling of perceptual disorientation has fed a lexicon associated with the precariousness of urban life: terms such as freefall, groundlessness and suspension are often employed in relation to the vertical growth of cities, and in recent decades have been endowed with wider sociological significance. According to Jock Young, 'Vertigo is the malaise of late modernity: a sense of insecurity of insubstantiality, and of uncertainty, a whiff of chaos and a fear of falling' (2007, p. 12). This malaise defines a period in which the foundations of socio-economic life have become increasingly unstable, thus perpetuating the 'everlasting uncertainty and agitation' that, as Marx and Engels famously observed, characterise the age of modern capitalism (or, as they would have it, the 'bourgeois epoch').

D. Deriu (✉)
School of Architecture and Cities, University of
Westminster, London, UK
e-mail: D.Deriu@westminster.ac.uk

Since the global financial crisis of the late-naughties, various critics have pointed out the underlying insecurity that pervades the ‘society of the precarious’ (Lorey, 2014), a condition that exposes the effects of neoliberalism on social relations and identities (Bauman, 2000; Verhaege, 2014). This state of affairs has been further exacerbated by the awareness of planetary imbalances that characterise the Anthropocene. Facing the threat of ecological catastrophe, the rise of political nationalisms, mass migration and growing inequalities around the world, Bruno Latour has called for a collective response to the present turmoil: ‘To resist this loss of a common orientation, we shall have to *land* somewhere. So, we shall learn how to get our bearings, how to *orient* ourselves’ (2018, p. 2). Arguing for a politics of resistance underpinned by universal human values, the philosopher deployed a trope of disorientation: ‘the sense of vertigo, almost of panic, that traverses all contemporary politics arises owing to the fact that the ground is giving way beneath everyone’s feet at once, as if we are all felt attacked everywhere, in our habits and in our possessions’ (2018, p. 8).

Contemporary high-rise architecture gives spatial form to this perceived loss of grounding. Indeed, it is the critical terrain on which verticality and vertigo coalesce, sometimes in dramatic fashion. Interestingly, these two terms share the same etymology (from the Latin *verttere*, to turn): while the former denotes a geometrical axis or direction, the latter evokes a whirling sensation of imbalance. Since the 2010s, the acceleration of vertical urbanism has been accompanied by a proliferation of so-called vertigo-inducing images on the internet, a visual culture that attests to a widespread fascination with tall structures (Deriu, 2016). At the same time, several artists have questioned the social and political implications of high-rise environments. One of them is Catherine Yass, whose photography and film installations often frame architecture in a state of construction, abandonment or demolition. By engaging with our perception of verticality, her works address the relationship between material structures and the institutions that embody them.

In 2015, Yass was invited to the first *Vertigo in the City* symposium at the University of Westminster. In her inspirational lecture, titled ‘Falling Away’, she reminisced about climbing up the roof of her childhood home and experiencing a heady feeling of omnipotence that was quickly superseded by an utter fear of falling: ‘It was like sitting on the line between death and survival’ (Deriu, 2021, p. 3). This anecdote evokes the equilibrium we seek out when facing the danger of losing our bearings. Thereby, Yass summed up the ambivalence of vertigo—a sensation that is associated with a spectrum of emotions ranging from thrill and elation to fear and anxiety. At the same time, that episode offered a cue to revisit her engagement with architecture as a site of vertiginous experience.

It was against this background that, a few years later, Michael Mazière and I curated an exhibition of Yass’s film installations in Ambika P3, a vast subterranean space at the University of Westminster that used to serve as a concrete-testing laboratory before it was converted into an art venue (Fig. 11.1). The works we selected, spanning two decades, deal with various types of vertical constructions and, at a deeper level, exemplify what might be described as ‘an art of vertigo’ (Deriu, 2021). Projected on the walls of a unique bunker-like space, the films blended with one another engaging audiences in their disorientating effects—further augmented by their ambient sounds. Some of them are particularly relevant to the nexus between visuality and verticality, to the extent that they represent tall buildings as sites of socio-spatial dislocation.

The earliest piece, *Descent* (2002), provides an unsettling glimpse of high-rise construction in London’s Canary Wharf. The viewer’s gaze glides along the skeleton of an office tower in slow motion. As the fog gradually vanishes, we realise that the camera (lodged in a crane) is moving down and not up as it initially seemed (Figs. 11.2 and 11.3).

By reversing the upward movement, this work reveals a deeper political motive: the sky-bound direction of the corporate city is turned on itself as the gaze is slowly grounded. Here the business district, symbol of the economic deregulation



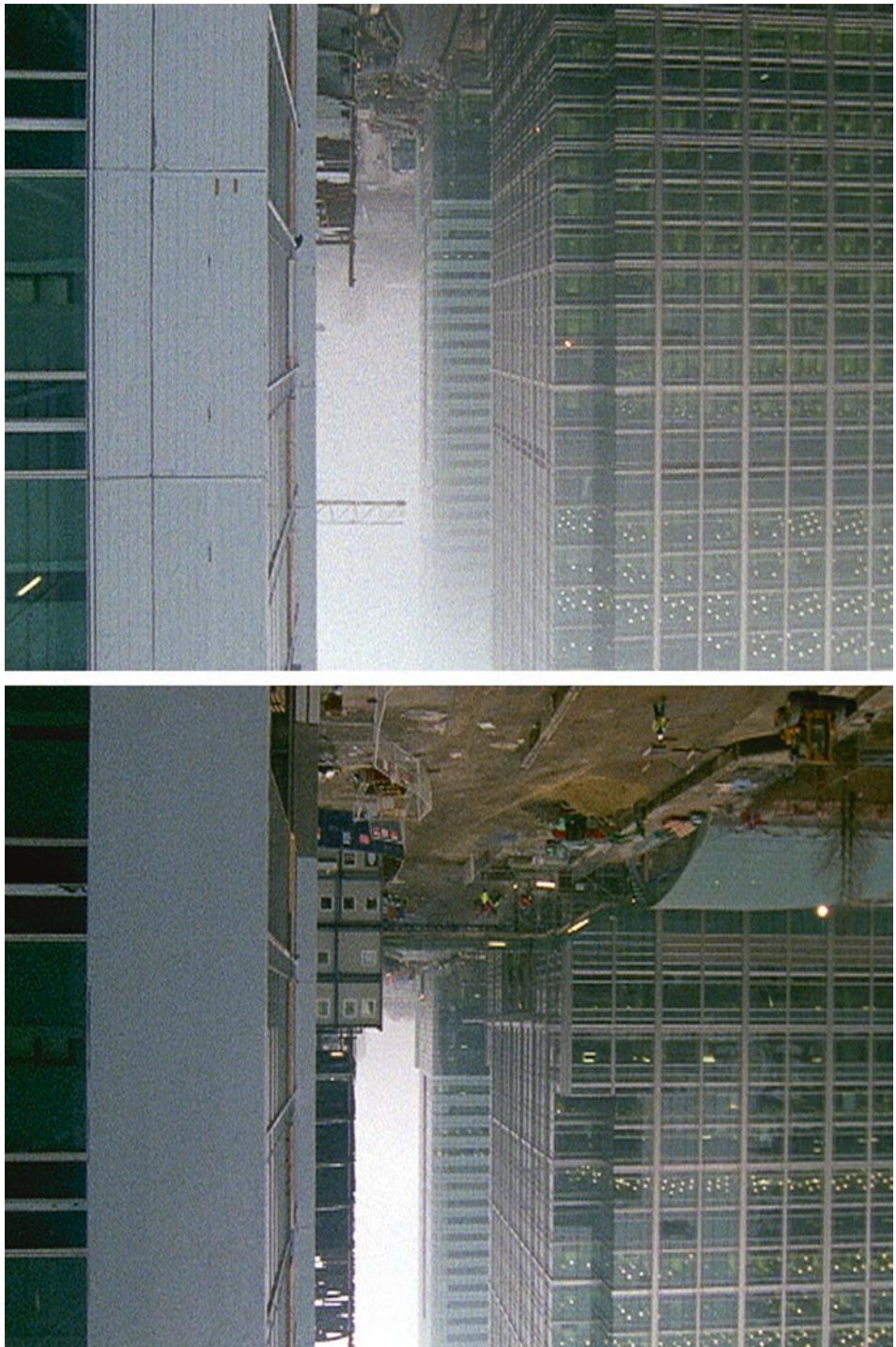
Fig. 11.1 Cover, *Falling Away* exhibition catalogue (edited by Davide Deriu & Michael Mazière, 2021)

that marked the Thatcher years, reawakens our ancestral imagination of the abyss—that bottomless place which opens up when the ground underneath our feet slips away. The sense of dislocation makes you interrogate when, as well as where, the scene is taking place; for the building site bears archaeological and futuristic semblances at once. In this respect, *Descent* evokes the biblical Tower of Babel and its failed dream to conquer the sky, a hubristic tale that resurfaced in the era of vertical urbanism.

Yass's subsequent films sustain her exploration of verticality as an ambivalent, and highly contentious, aspect of urban development in Britain. None of them is more poignant than *High Wire* (2008) a multi-channel installation that was shot at Red Road Flats, Glasgow, an ill-fated complex that has since been demolished (Fig. 11.4). When inaugurated, in 1971, the estate was the tallest social housing project in Europe and was hailed as a modern wonder. Yet, after decades of social anomie and neglect, in the

noughties the estate was slated for demolition. Before its demise, Yass commissioned the tight-rope artist Didier Pasquette to stage a high-wire walk between two of the 31-storey-high towers, which she filmed from different points of view including a camera on the funambulist's helmet.

The piece was intended to question the experience of vertical housing and the underlying tension between the dream of conquering the sky and the anguish of falling. However, the performance was hindered by heavy winds and, unexpectedly, the funambulist had to step back to safety part-way through it. Thwarted by the elements, the aborted wire-walk came to embody an architectural ambition that was about to collapse. The resulting installation, which was recreated in Ambika P3, immerses the audience in a near-enclosed space bound by four projection walls. By destabilising the viewer through multiple camera angles, this work induces a mismatch between inner feelings and outer reality that is akin to feelings of vertigo.



Figs. 11.2 and 11.3 Stills from *Descent* (Catherine Yass, 2002, 16 mm film transferred to digital media)



Fig. 11.4 *High Wire* (Catherine Yass, 2008, 16 mm film and HD cam transferred to digital media). Four-screen installation at Falling Away exhibition, Ambika P3, London, 2021. (Photo by David Freeman)

Yass's art of vertigo reaches its climax in *Last Stand* (2019), which was shot in Nine Elms, a former industrial site on London's South Bank that was turned into the largest regeneration zone in Europe.

The film sets off with the camera tracking up on a crane along a concrete frame under construction: blue numbers are etched on each floor, punctuating the ascent like giant elevator buttons (Fig. 11.5). At the summit stands the artist herself, on a metal scaffold, surrounded by iron reinforcement rods jutting out of the concrete. Perched atop the unfinished structure, Yass takes a stand against the vertical growth that has been reshaping London's landscape. Her show of defiance is fraught with the tension between the impulse to conquer the sky and the spectre of an imminent downfall, evoking once again the hubris of high-rising architecture.

The building site here embodies the stealthy yet relentless triumph of neoliberal urban development. The camera, mounted on a crane as in *Descent*, moves in circles around the artist's

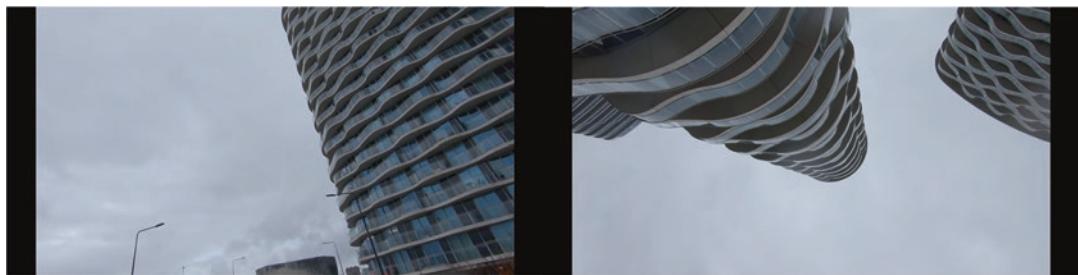
unwavering figure and shows the built environment that is rising all around. Multiple rotations elicit the frenetic growth of an area driven by corporate offices and luxury apartment blocks. Turning the gaze of power on itself, the artist's body becomes a living measure of the scale of construction. Thus, in *Last Stand*, the visual disorientation caused by the revolving camera movements makes one further aware, at a visceral level, of the vertiginous pace and scale of urban 'regeneration'. While contemplating the monumental scale of inequality, a sense of dislocation registers not only at a perceptual level but on a cognitive plane as well. While in *Descent* a slow-moving picture emphasises the vertical construction, in *Last Stand* a combination of rising and swirling motions conveys a feeling of dizziness: these films were installed at different levels within the exhibition venue, in such a way that audiences could catch glimpses of both at the same time (Fig. 11.6). Staging unexpected dialogues between different works was a key aspect of the curatorial strategy.



Fig. 11.5 *Last Stand* (Catherine Yass, 2018, 16 mm film transferred to digital media)



Fig. 11.6 *Last Stand* (left) and *Descent* (right). Film installations on display at the Falling Away exhibition, Ambika P3, London, 2021. (Photo by David Freeman)



Figs. 11.7 and 11.8 Stills from *Concrete Mixer* (Catherine Yass, 2021, HD video, 2 screens at right angles)

The sense of dislocation is given a new twist in Yass's latest architectural work, *Concrete Mixer* (2021), a site-specific video made during the COVID-19 pandemic. As the lockdown measures delayed our exhibition plans, the artist made this video in direct response to the space of Ambika P3. The video was shot using two HD cameras placed on the turning drum of a concrete mixer lorry driving through construction sites in East London, on a loop that begins and ends at a concrete plant in Silvertown. The circuit echoes the motion of the drum, on which the cameras were placed at right angles; one looking backwards and the other sideways. A landscape of buildings, roads and sundry infrastructures—many of which are made of concrete—unfold in relentless circles under cloudy skies, as the rotating views test our ability to orient ourselves. This peculiar camera set-up allowed the artist to capture simultaneous views of the urban environment from ever-changing angles (Figs. 11.7 and 11.8). In its premiere at *Falling Away*, the videos were projected on adjacent walls within a small and secluded room, so as to amplify the haunting effect of this installation.

Once again, a sensation of dizziness is inescapable. Yet, this time the subject is not a specific architecture but rather an entire area under development. Highlighting the impact of construction on the rampant environmental crisis, the artist here alludes to the vertical rise of London in a way that is only visible at fleeting moments: in keeping with her previous work, though, Yass employs the very instruments of the construction industry and turns them on itself. If other installations are based on crafted camera movements,

and in some cases on the inversion of the picture, here the process is deceptively simple: the continuous turning of the drum is sufficient to induce vertigo, while the vertical dreams prefigured by the concrete mixer are left to be imagined.

A distinct sense of vertigo pervades the film installations exhibited in *Falling Away*. Their subjects are structures that, for all their diversity, unveil the precariousness of our social fabric, as also depicted in other films shot at a public hospital undergoing demolition (*Royal London*), a BBC centre dismantled for real estate (*Aeolian Piano*) and a dismissed lighthouse on an offshore concrete platform (*Lighthouse*), whose upturned aerial view features on the cover of the catalogue (Fig. 11.1). Oscillating between the desire of elevation and the anxiety of falling, architecture is depicted in various states of suspension. Not by chance has Yass's work been considered among those art practices that embrace dizziness as a method while seeking out 'the creative and generative potential of this in-between state' (Anderwald & Grond, 2019, p. 24). Bringing this attitude to bear on architecture, her films subvert the stability of the ground and explore the capacity of this medium to create new types of visuality. Ultimately, this giddy-making body of work reveals compelling insights into the vertiginous transformation of our cities—and of our societies.

References

- Anderwald, R., & Grond, L. (2019). Dizziness – A resource? In R. Anderwald, K. Feyertag, & L. Grond (Eds.), *Dizziness – A resource* (pp. 22–53). Sternberg.
- Bauman, Z. (2000). *Liquid modernity*. Polity Press.

- Deriu, D. (2016). 'Don't Look Down!' – A short history of rooftopping photography. *The Journal of Architecture*, 21(7), 1033–1061. <https://doi.org/10.1080/13602365.2016.1230640>
- Deriu, D. (2021). The art of Vertigo: On Catherine Yass's architectural visions. In D. Deriu & M. Mazière (Eds.), *Falling away: Catherine Yass at Ambika P3* (pp. 3–21). University of Westminster.
- Graham, S. (2016). *Vertical: The city from satellites to bunkers*. Verso.
- Graham, S., & Hewitt, L. (2013). Getting off the ground: On the politics of Urban verticality. *Progress in Human Geography*, 37(1), 72–92. <https://doi.org/10.1177/0309132512443147>
- Harris, A. (2015). Vertical urbanisms: Opening up geographies of the three-dimensional city. *Progress in Human Geography*, 39(5), 601–620. <https://doi.org/10.1177/0309132514554323>
- Latour, B. (2018). *Down to earth: Politics in the new climatic regime*. Polity Press.
- Lorey, I. (2014). *State of insecurity: Government of the precarious*. Verso.
- Quinodoz, D. (1997). *Emotional Vertigo: Between anxiety and pleasure*. Routledge.
- Verhaege, P. (2014). *What about me?: The struggle for identity in a market-based society*. Scribe Publications.
- Young, J. (2007). *The Vertigo of late modernity*. Sage.



Towards a Typology of Imaginary Skyscrapers

12

Ana Aragão

*You built your tower strong and tall
Can't you see it's got to fall
Someday*

—Townes Van Zandt, Tower

What if the city's only option was to grow upwards, turning commonplaces into an endless vortex of rooftops? What if the architect was able to project the outcome of already aged, obsolete, decadent structures? What if we were able to draw not only space but also time? We have got so used to drawing the timeline horizontally that we didn't even notice when it became vertical. Ancient and modern times were chronological and horizontal; postmodernity condensed it into an infinite vertical line.

Urban structures of vertical development question the evolution of the post-metropolitan territory (which we insist on calling "cities", incurring repeatedly in *lapsus linguae*) and its possibilities for growth. Verticality, a solution found mainly in the huge metropoles of the Far East, has been the solution to the problem of lack of space, fulfilling, without ideology, the great architectural utopias of the twentieth century (futurism, modernism, metabolism, high-tech). In the age when information shifts towards the clouds, architectural form does its best to reach the skies, like the myth of Babel.

Due to its spatial and symbolic presence, no skyscraper is indifferent to us. This fascination with verticality stems from the relationship between the body that walks on two legs, as opposed to the animal, as the vertical construction is the apogee of

human manifestation of the artificial, a dizzying approach to the limit of technology.

Looking from above presupposes an imaginary conquest of territory which is observed; we see further afield, like "dwarfs on the shoulders of giants". This scope of vision fulfils the contemporary man's psychological desire for ubiquity.

The fact is that today we live in giant condominiums, as in the skyscraper described by J.G. Ballard (*High-rise*, J.G. Ballard, 1975). Those cubic interior spaces that we inhabit are extremely close together yet profoundly separate. Perhaps it will be enough to look from the outside, as in Macau—a small city in South China and a former Portuguese territory, to understand that from the inside we have pushed everything towards the windows, in a desperate desire for emptiness, for a fresh start, for claiming our lost individuality.

Post-Modern Falling Dreams

Breathing gravely through the foothills of the flying or levitating structure are the pipes of its subsistence, or, better to say, its survival. The paradox of temporality: the only way of resisting time is an optimistic resignation to it. Some clothes and bed sheets appear in window ledges as if they were telling about the bravery or anguish of the inhabitants who were never to be seen. The lives of people that occupy the build-

A. Aragão (✉)
Porto, Portugal
e-mail: info@anaaragao.com

ing can only be imagined. Or is this vertical anti-icon empty? An almost semiotical reading of the chaos of the slabs, panels and tiles detached from the walls (almost like skin peeling off) alludes to former blood, sweat and tears. If so, where did everybody go? Is there anybody out there?—we ask, like in the famous Wall. The vegetation conquers place, space and time to the building, transforming it into a sort of tree house. The curtains are ineffective in their attempt to protect intimacy. Everything is revealed outside through the cages because the space inside has shrunk. The skyscraper confronts, in its very structure, the traditional house, where floor and ceiling are divided by stretch of a lifeline. In the high-rise, the ceiling disappears, the top is simply unreachable. Is it possible to rotate each part of the structure like a Rubik's cube and discover other perspectives, other views of the landscape surrounding it? Like a rotating assemblage of robotic parts? Perhaps, but what good will such a vision do when inside one experiences utopia and dystopia simultaneously? At the top we find the magic of the panoramic view and the fateful inoperability of two clogged chimneys, with no sign of smoke to give light to existence. It is the ultimate dome of the various terraces that were born from the branches of this building-tree. A gleam that preserves the oneiric, the fabulation of ever-changing cycles (Fig. 12.1).

Devotion to Emptiness

Megalomania exists between the earth and the sky. Perched on a horizontal structure without knowing whether floating or having foundations in any kind of soil, its posture is vertiginous in a challenging overlapping of blocks. Can a complex of buildings be also called a skyscraper? The question is clear: Is verticality defined by form or by *Stimmung*. Vocation? Ancestrally struggles with futuristic scenarios, fed by glazed tunnels that are sometimes underground and crawling, sometimes aerial, like the Italian Futurism so confidently proposed in the

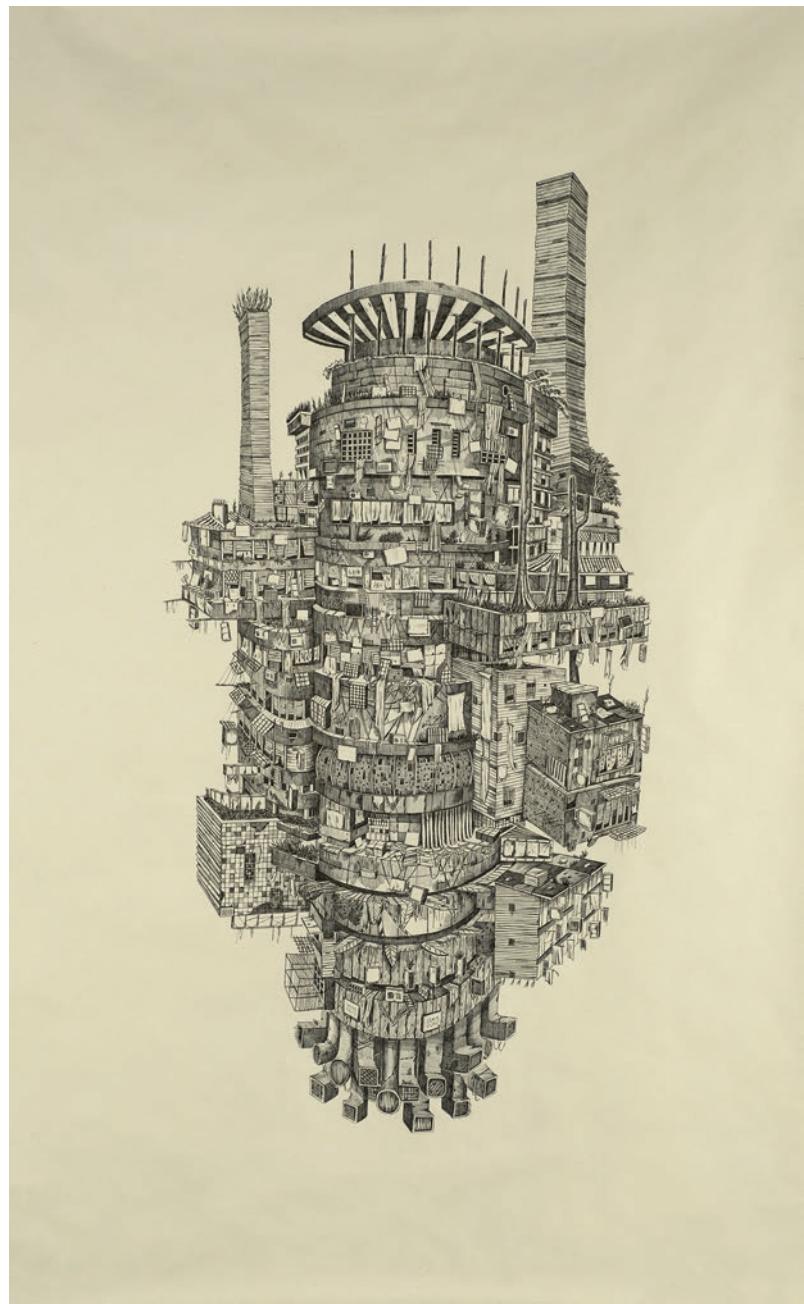
beginning of the twentieth century. *The street will no longer lie like a doormat*, they stated vocally. The most romantic view of a street is an empty one, waiting for trains that will never appear. A train in the sky is not wishful thinking anymore, as the amazing bullet train has demonstrated. A levitating bullet train that operates vertically fulfils the dream of an effective ascent to heaven. Nevertheless, David Byrne would go on to note, “heaven/ heaven is a place/ a place where nothing ever happens. A palace or a cathedral of consumption can only be reduced to the proclamation of individuality by the crowds” (Fig. 12.2).

The bathtub on the windowsill awaits the voyeur. The stairway (made of wood or vines) descending from it and flanked by a hammock made of fabric is a privileged place for observing a body that may or may not appear. So available, so open, unlike the railings that enclose some of the windows. The additions, the structural protrusions—ones which propose a new kind of aesthetic—are attached to pillars, becoming trunks that no longer renew the air. The windows are broken, decaying and falling, just like hanging pieces of fabric, as if bowing to the passage of some sacred figure. The ornaments that now evangelize this cathedral are the air conditioners and the faded neon signs, as if out of date, out of a time gone by. Utterly difficult to anchor in any concrete reality, the unrealizable fate of this place rests within its destiny, most certainly a punishment for some capital sin.

The Humanization of Lost Individuality

There is always something human about a building. This is not only due to the hands that constructed it, but also because of the humanity absorbed from its creator at the genesis. If only for the purpose of a mental exercise, let us imagine a building is a drawing—a drawing that sprouts two feet while disconnecting vertically from its virtual urban surroundings. This

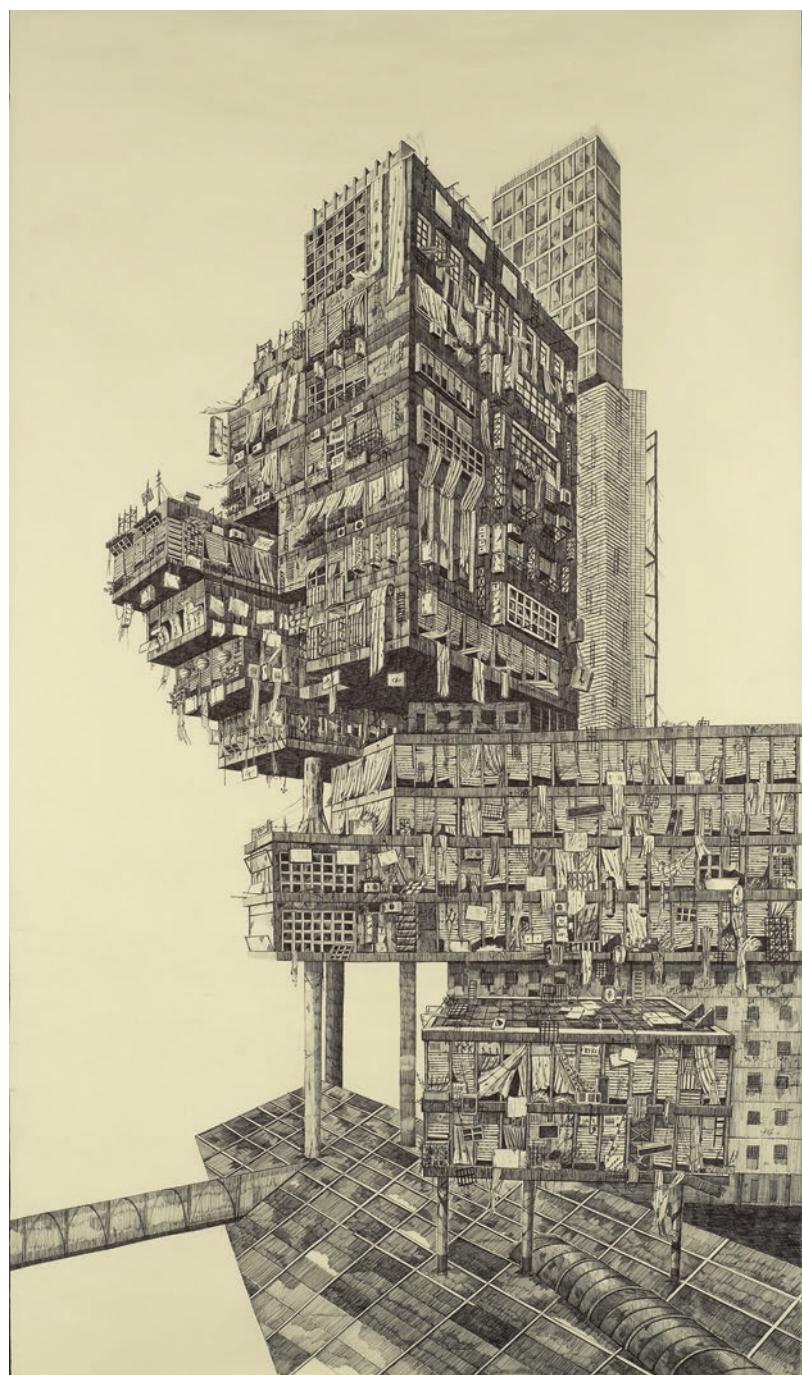
Fig. 12.1 Ana Aragão,
Flying Machine, 2018,
100 × 164 cm



walking structure is provided with the sense of vision; it does not have two eyes, but multiple eyes; it even has eyelids and eyelashes (all magically materialized in windows, shutters and blinds). Vegetation covers the structure in an attempt to save the building from dehumanization. The cables changing from the most ran-

dom places try to tune into some forgotten radio frequency, but only a dense white noise is to be heard. The cables and threads seem to levitate and literally connect the parts of this architectonic structure in a visual analogy with uniting broken and defeated parts of the human soul. Or with a broken heart that could not resist its

Fig. 12.2 Ana Aragão,
Framed Cathedral,
2018, 100 × 164 cm



own vanity. Tall buildings are usually products of vanity or ambition, either in a shallow or in a very admirable way (Fig. 12.3).

Frames and mirrors appear in the facade as parables of the ruse of inner living. All doors

lead either to nowhere or to secret paths yet to be revealed. The tiles convey the sense of familiarity and belonging of our collective memory, covering this body-building with a nostalgic atmosphere, contrasting with endless lost

Fig. 12.3 Ana Aragão,
Walking Pyramid, 2018,
100 × 162 cm



cables. The question of whether technology has come to unite or disunite seems already obsolete. This Walking Pyramid has grown in height, filled with everydayness, demonstrating that regardless of the mystery surrounding its construction, the pyramids of time will be the eternal metaphor for the library of human knowledge.

The Ultimate Invasion of Urbanity by Nature

Haze is where everything begins or sinks, where everything is dreamed of or fades away. The protection of a building has withered away, leaving only the walls or master beams that sustain the verticality of the structure. Nature has

brutally or gloriously invaded man's building, demanding a glorious victory. *In the beginning was the word.* Was it really? Perhaps in the beginning was nature. Nature that tore away walls, allowing for an unashamed look inside. This building echoes one of the most expensive houses in the world (Antilia, Mumbai, India) although this version is occupied by eternal wanderers of the future. Occupation and anonymity are two of the most key concepts of contemporaneity and cannot be separated from architectural and urban thought and action. The exaggerated verticality of a single house is a clear denial of horizontal urbanity and the clear statement to the inhabitant that he is not equal to its peers. An upwardly distorted dwelling is a sign that something is not right. The problem is not really the diagnosis, but finding the proper treatment for the growing polarization of societies and social classes is. A house for a family that has more than three bathrooms is obviously outrageous, but the fact that the majority aspires to those *fake empires* is simply pitiful. Somehow people have forgotten the purpose of fiction (the only explanation for the viral relativization of "the truth"); they forgot even what it meant. Fiction now means chair or lamp. Some still miss the times when utopia meant a map (Fig. 12.4).

Nature may be our ultimate redemption. Wild vegetation emerges from any fissure that dares to crack, occupying the eaves, emerging from what is left of the surviving walls or stairs. One does not know whether it is the jungle or the rurality of the fields. Dense vegetation, in itself a part of fortification, revitalizes interior spaces, saving them from obsoleteness, ruination, destruction and paradoxically, chaos. It is nature pushing technology to the edge until it plummets back in time in a sort of need to make peace with tradition or the primitive elements of life. The building was gutted, its spectacularity deconstructed to find a carcass or a skeleton of drawers that reveals other social, architectural and urban concerns. This is the kind of story that goes unreported on television because it has no punchline, only millions of lines that, if seen closely, make no sense at all.

Fictional Reality

This is the story of a skyscraper that has its foundations somewhere between the probable ground and the imagined sky. It grew irregularly, with long columns that could belong to Classical Athens converted to Oriental culture, thus testing the formulation of canonical architecture (harmonic and geometric) with the rebelliousness of metabolic architecture. Verticality is a stack of impossibilities. The solidity of stone is shaken by crooked and broken wooden stairs, not always capable of establishing true connections between the levels. The sumptuous skyscraper, whose drama is given by the rags laid out on handrails and balconies, by air conditioning boxes—which seem to populate the building with chilled eyes—is composed of horizontal and vertical corridors of windows, like a game of Scrabble, or a Cheshire Cat's speech. Do the old neon signs still emit a signal of presence? Is there still something valuable to sell? Or have small screens become signs of resistance of the individual that wins a place for the gambler in his ruined empire? The columns of classical wisdom now support what appear to be additions made of the most humble and rudimentary materials of carpentry, masonry and stonework. Small courtyards are organized in square metres as resting points in the climbing. Every building is a turning point between the East and the West and especially between the South and the North. Direction: upwards. Every skyscraper, like every person, is a vertical line linking the underground to the all-mighty gods, linking hell and heaven (and never the other way round). The view from the terrace is only accessible to the imagination of those looking from within the drawing (Fig. 12.5).

Visionary City

Drawing transforms the impossible into the possible. What if a building is a cloud that hovers candidly in the sky? What if the city detached itself from the ground and arranged itself futuristicly and buoyantly in the air? Could roots rise up like threads holding balloon buildings

Fig. 12.4 Ana Aragão,
Social Obsolence, 2018,
100 × 186 cm

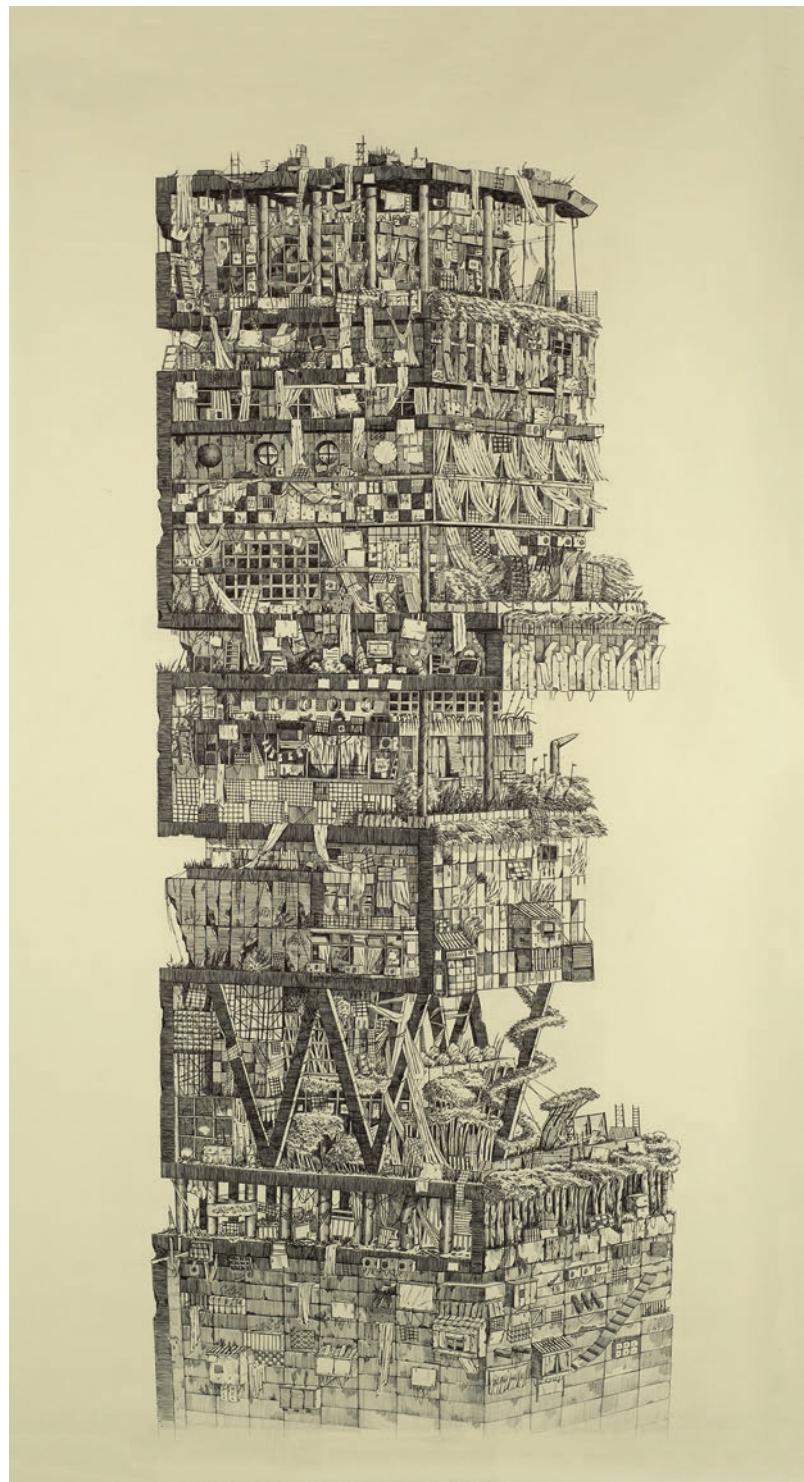


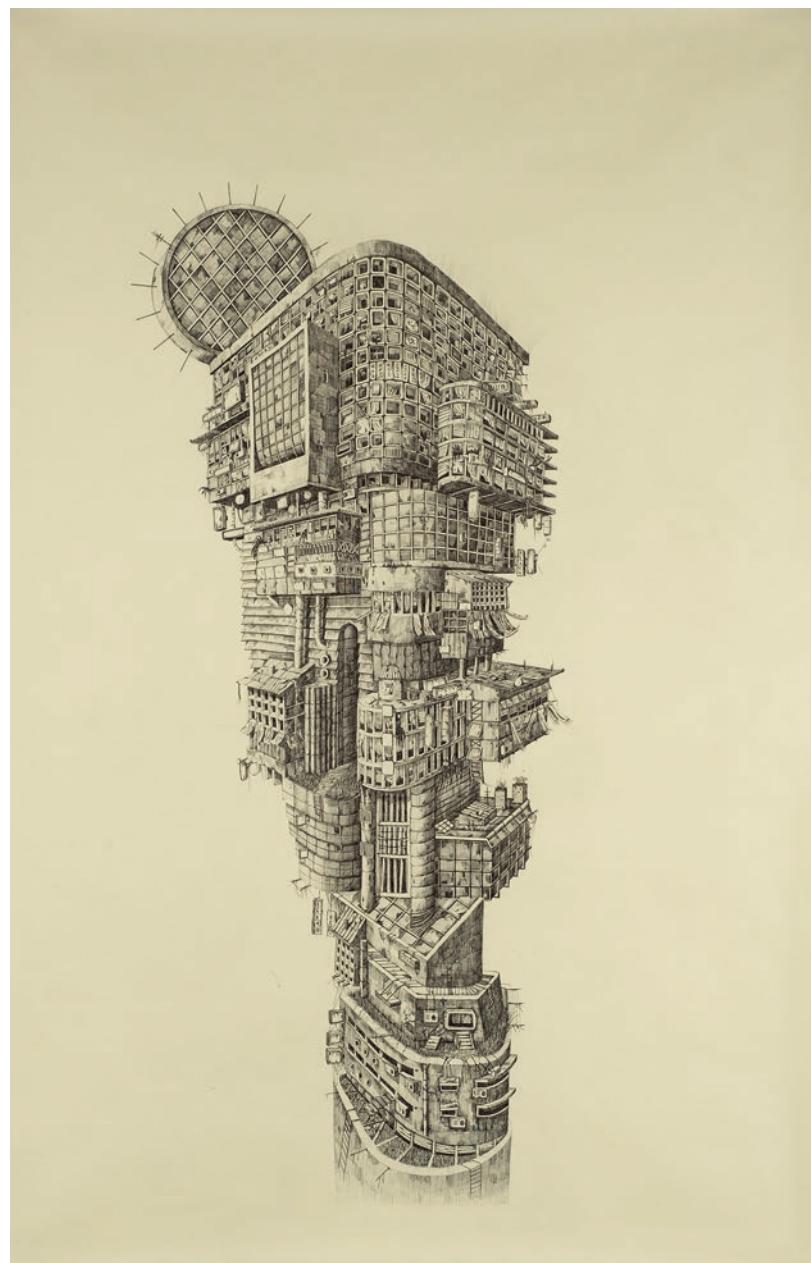
Fig. 12.5 Ana Aragão,
Last Fiction, 2018,
100 × 179 cm



together, thus preserving tenuous relations with an earthly reality? The exercise of climbing is required to ascend the construction, which rises like a mountain with mystical ledges. The rows

of little windows take the form of cubicles where one can hide. They are small broken safe boxes that hold stories waiting to be told: the curtains, the shutters, the blinds, sometimes fluttering,

Fig. 12.6 Ana Aragão,
Cloud Cover, 2018,
100 × 158 cm



sometimes broken, sometimes completely open—behind all of them a black shadow is hidden. Only dream has the power to enter, to trespass, interrupting the present of daily life in search of the former present, the so-called past. They are narrow, compressed cages—housing capsules—from which unseen humans have the possibility to glimpse the wide outdoors. Is each

of them a house or a room in a house or a condominium of palatial proportions? (Fig. 12.6)

This architectural object has something machine-like about it: its base could be an energy reservoir or the engine room that once made an entire city live in a single skyscraper. Has Chihiro come across this strange castle during her journey? A stiff skeleton that widens

upwards, encountering a kind of small lifeboats that have grown out of the structure—or have been attached to it, plugged in, like Lego blocks?—until reaching the apogee of urbanity. Finally another coronation. Is it a rising sun? Not impossible if we're before a house. Or maybe rather a setting sun, already a bit thorny—radiant days are over.

Conquering Individual Spaces to Outdated Futuristic Structures

The lines are so straight that it seems there is no escape from the four flat walls. No entrance doors, only windows to be broken into. But where is the entrance to the building? How does one get in when the beams and walls seem to rest on the floor without piercing into the ground? Where is the labyrinth that must be traversed to find not an exit, but the entrance to this building? We all know where it comes from, but where is it going? Mixed feelings rise from the view of different types of windows popping up with huge books, suspended sofas, giant cuckoo houses, baskets as balconies, fallen sheets, washing machines, walls or nailed boards covering balcony windows, chess boards serving as windowsills, mailboxes, packages, televisions, drawers, mattresses, comforters, plants. Overlooking a landscape that does not exist (is it a Super-studio-like reticule?), the interdigital spaces of the windows are by no means intimidated by the wind. This failed Modernity, like the former one, has a superhero cape. The abstraction of orthogonality is interrupted by the mundanity of everyday life that pops out of the windows. Like in J.G. Ballard's High-rise, this narrowness implies suffocation. Who is who? What is behind that tall foot that seems to contrast with everything else? All these questions lead to a rabbit-hole that swallows everything and works as the black hole of our need of void (Fig. 12.7).

Are we still in Manhattan, or rather in a city that has gone crazy after years of forced confine-



Fig. 12.7 Ana Aragão, *Failed Modern*, 2018, 100 × 232 cm

ment? This Seagram does not reflect the sun, nor does it look photogenic for the casual viewer and the interested architect. This Seagram is not the Seagram although divinity remains in the details. Or so we hope.



Higher Returns

13

David Kendall

‘Artist’s (or architectural) impressions’ are visual devices that hover between concepts and reality. ‘Vivid images’ (Lynch, 2010) are conjured up as seductive perceptual impressions and propose what a building’s distinctive shape and form may take. These economic proposals are utilised to ostensibly promote architectural lifestyles, in this case study property development in the United Arab Emirates (UAE). Computer Generated Images (CGIs) of the UAE invents ‘fictions’ (Rancière, 2004) as semiotic arrangements that stimulate presence between architecture that might exist and buildings present on the ground in the UAE. Consequently, these visible images intersect with geographical space and are knowingly employed to typically describe and powerfully influence the visual perception of distinctive architecture and the expanded city. This ocular convergence plays with aerial visions of close-up and distant observation, and complex intersections between proximity, visible presence and absence along or below horizons (Fig. 13.1).

In 2008 I began collecting property brochures depicting Computer Generated Images (CGIs) of Dubai, UAE. An archive has been compiled that includes architectural developments in the United Arab Emirates, Gulf region and Asia. I was drawn

to the speculative and aspirational nature of the aerial architecture and the sensory atmospheric qualities of the visual design. I’m interested in the disembodied sensations evoked when seeing speculative commercial CGI aerial visualisations of property development in the UAE, juxtaposed with potential links to historical photographic subjects and processes in the built environment (Fig. 13.2).

Since its historical conception in the nineteenth century, architectural photography has universally had an ongoing history of image manipulation and retouching (Pelizzari & Scrivano, 2011).

The role of the blueprint is central to this process and is utilised to copy, reproduce or duplicate existing architectural plans and images. My visual chapter *Higher Returns* explores how the historical photographic process: Cyanotype printing merges seamlessly with CGI scans.

The chemical experiments play with the ambiguous hybrid material form of the architectural blueprint that fuses photographic printmaking with spectral past and present architectural image-making processes. As a result, producing new analogue pictures of digital settings that embed and subtly suggest possible presence, aerial images never fixed or fluid: Studio imprints of what unique architecture may materialise or remain absent in future urban development within the UAE (Fig. 13.3).

In the UAE, Dubai is a city that is typically defined by ‘visible image’ and is intentionally

D. Kendall (✉)
Department of Sociology, Goldsmiths, University of London, London, UK
e-mail: d.kendall@gold.ac.uk

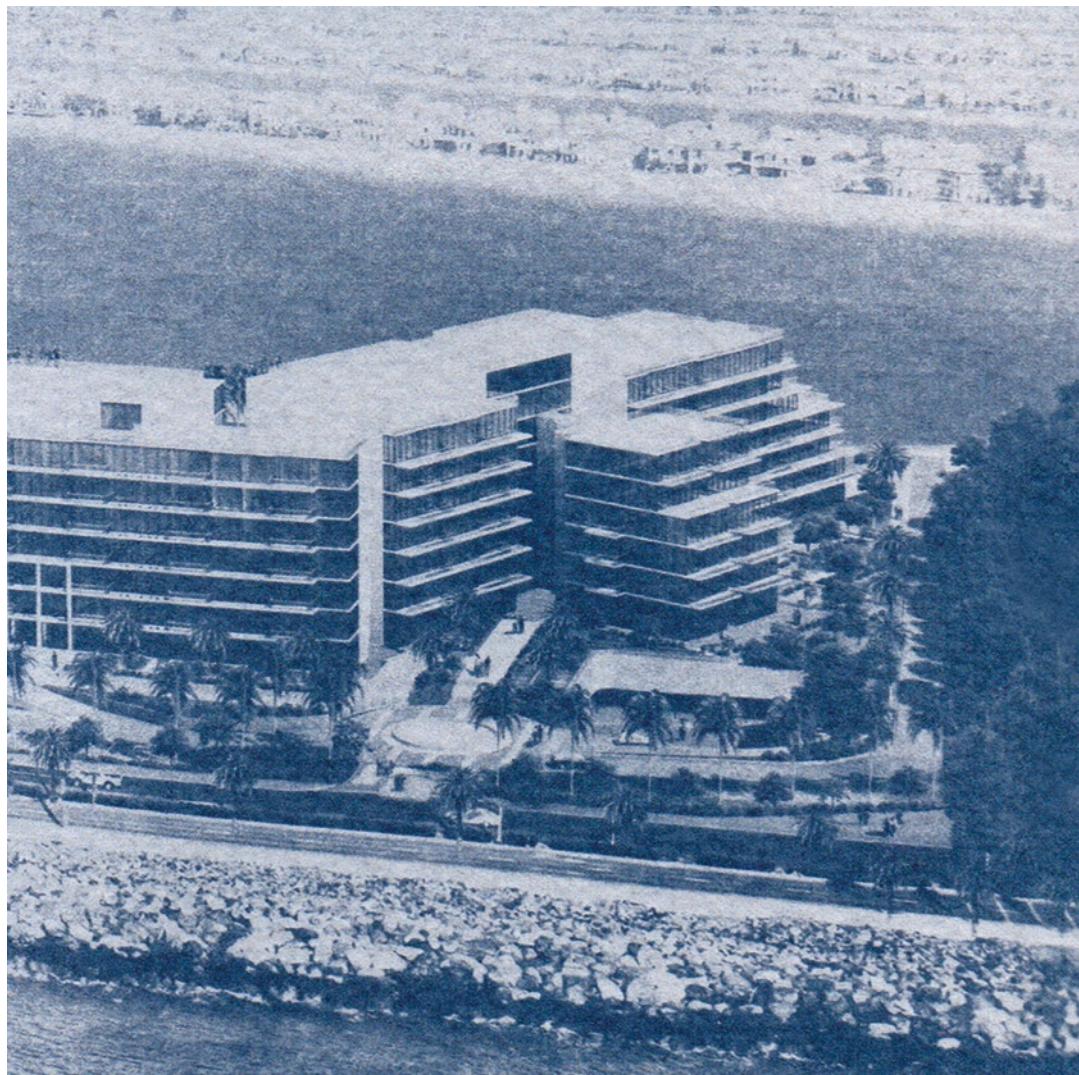


Fig. 13.1 Unique land, unique landscapes, David Kendall, 2023

created to be visually consumed. As a consequence, its urban identity manifests through speculative investment in its emerging image, situated between its apparent reality and virtuality and is seen or perceived from a distance. These ‘bird’s eye’ aerial viewpoints visualise urban transformation linking Dubai to global sites in other principal cities (Carl, 2007). These elevated digital views convincingly portray atmospheric vertical sites potentially extending towards or beyond a visible horizon, presenting structural environments as familiar architectural photogenic viewpoints. Therefore, object hori-

zons offer many atmospheric visual spaces for collective human imagination to expand and contract (Merleau-Ponty, 1964). As a result, perceptual engagement with these images interrupts and illuminates individual and collective imagination, bridging past and present reality with virtuality and give rise to ‘dialectical images’ embedded in the relentless flow of visual experience (Gilloch, 1997).

Architectural models visualise temporalities, allowing a visual ‘bridge’ between existing spatial realities and proposed futures even if such futures will never exist outside of the model. The



Fig. 13.2 Where life is extraordinary, David Kendall, 2023

architect, George Katodrytis, writes that GIS and reconnaissance technologies create Dubai's 'imagery transmitted long before its reality' (Katodrytis, 2007). Visual virtuality dominates over reality in an expanding city envisioned from above that appears to have no centre or core (Aima, 2022).

I would suggest that Dubai's image has become its global core, and these structural images unsettle notions of time and space (Borden, 2007). They are virtual idealisations rather than abstractions, giving the impression that an architectural past endures, and they are built spaces that exist

in physical reality. Yet the fact that each constructed photographic print is unique and exists as a material object. The images are thus a 'perceptual throwback to history' (Lefebvre, 2004) glimpses, not accurate visions of actual existing landscape architecture (Shields, 2003).

As a desired result, aerial artist's impressions of the UAE typically indicate mythical environments (Elsheshtawy, 2004) and possible futures and could be defined as ocular intersections between the past, present and the possible future. Economic desire promotes an intersection between what is present and absent within a

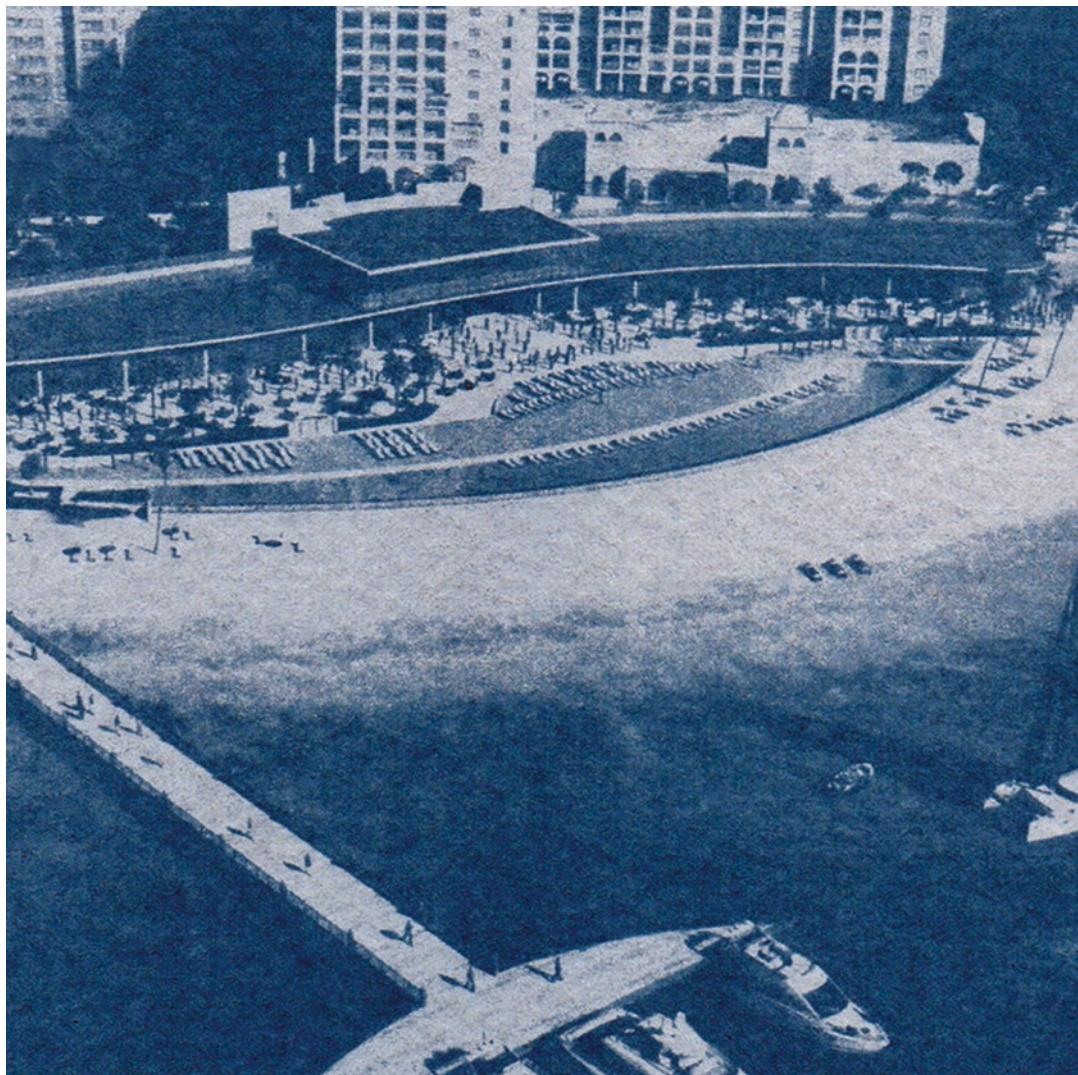


Fig. 13.3 This is elevated living, David Kendall, 2023

published image. The artist's impression can exclusively exist if one believes it exists, if not it stays fiction. However, these idealised images are deceptive, and they give the impression that the historical past is present and that they realistically are actual physical geographical spaces. Yet the fundamental fact that these distinct images have been digitally constructed means they undoubtedly exist and naturally influence my project development (Fig. 13.4).

The visible images made for the essay are montages that aim to dislocate and renew vision, reproducing and reprinting CGI images cata-

logued in promotional and sales publications. The Cyanotypes remain visible objects that uniquely represent and fuse the idealised past and the eternal present. They uniquely represent illusionary spaces that stimulate possible presence and play with the intuitive belief that these artworks naturally produce an accurate picture of tangible reality. The printed reproduced objects instantly offer the expressive potential that the architectural structures will undoubtedly exist in a material form in a foreseeable future. It is ordinarily the likely viewers imagination that triggers the dialectical relationship between geographical



Fig. 13.4 Good life, made affordable, David Kendall, 2023

sites and explicit images. Therefore, as a published result, referencing or faithfully reproducing the visual language of a photogenic picture powerfully reinforces the reasonable assumption that the functional architecture portrayed in ambitious blueprints exists regardless in topographical space.

Therefore, processes of reproduction are important in this project; elevated analogue image formations and viewpoints present a macro view of the city extending towards a horizon. In addition, the visual horizon effect influences the vertical perception of the size of objects on the

ground surface (Marshall Zarazaga, 2011). One could note that if one looks close at the design of these building projects it is the ‘ideal’ rather than the design that takes precedence. The viewer looks at the city in close-up and at a distance at the same time, these images both unpack and restrict knowledge of what the city could be, to be close up is to imagine and dream of being in the city, yet they are observed vertically from geographical distance. These images of Dubai seem to disrupt what Walter Benjamin describes as the ‘plurality of close up and distant observation’ (Gilloch, 1997). The photographic

images act as an interface between the imagination and geographical space. They present Dubai as historical metaphor and built form, yet they also offer the city as a new visual experience (Carl, 2007) (Fig. 13.5).

Since the valuable invention of reproductive photography, many pictures of architecture have been perceived via photographs. As a result the majority of visual production and reproduction of architectural buildings and urban environments has been photogenic. In this specific project I'm intentionally using the Cyanotype

printing process discovered in 1842 by Sir John Herschel (Stulik & Kaplan, 2013), that inevitably came to be universally known for its reprographic use as a design blueprint. Utilised to present and record plans, objects and proposed structures in architectural, archaeological, topographical and engineering projects. The moderate cost and comparative ease of continuous production meant the Cyanotype print medium became economically a standardised process to proof on-site construction plans. Furthermore, the medium proved to be efficient in generating



Fig. 13.5 The lifestyle you dream of, David Kendall, 2023

work-in-progress images of building development made from large-format photographic negatives (Stulik & Kaplan, 2013).

These historical printed objects represent established material structures constructed in the world and offer audiences the professional and elevated viewpoints of the urban planner and architect. This familiar spatial and visual perspective, vista or the horizon has undoubtedly become as Robert Elwell, writes a ‘currency of architectural exchange’ and as a direct result socially and culturally embedded in how urban space and typical architecture is spatially experienced, bought and sold since the nineteenth century (Elwell, 2004; Rose, 2022).

Moreover, representation always seems to be about guesswork and a reliance on previous visual experience (Shields, 2003) the photograph and digital image merge as models to create a mix of personal, shared history and narrative. Creative opportunities to develop visual strategies in image construction provide options to explore object horizons and different viewpoints where collective imagination expands and contracts (Merleau-Ponty, 1964).

The rendered images compress time, history imposes itself on the present reality fuses with virtuality. The act of speculative engagement with the image connects human imagination with potential reality. As a result, these artworks continue developing themes in my visual research practice, the images do not represent a real past but the subjective past via a ‘bird’s-eye’ view glimpsed in a new image (Kendall, 2022). The Cyanotypes presented in this chapter are creative experiments with visible horizons and atmospheres. I’m carefully investigating illusionary composite spaces of previous and present-day pictorial image production and cultural reproduction, composed locations of what is ordinarily seen in conventional past or present architectonic images. Therefore, each handmade print represents a unique tangible object that seems to be photogenic yet is not. As a result, my image making doesn’t solely represent a vertical cityscape but intentionally produces other illusionary urban spaces mediated through inter-

weaving and reproducing historical photographic processes and promotional images of Dubai, creating new aerial scenes of the United Arab Emirates urban landscapes.

References

- Aima, R. (2022). *The Khaleeji Ideology*. Retrieved October 15, 2022, from <https://www.e-flux.com/architecture/horizons/498319/the-khaleeji-ideology/>
- Borden, I. (2007). Imaging architecture: The uses of photography in the practice of architectural history. *The Journal of Architecture*, 12(1), 57–77. <https://doi.org/10.1080/13602360701217989>
- Carl, P. (2007). Learning from, learning from Dubai. In S. Basar (Ed.), *Cities from Zero* (p. 114). Architectural Association.
- Elsheshtawy, Y. (2004). Redrawing boundaries: Dubai, an emerging global city. In Y. Elsheshtawy (Ed.), *Planning middle eastern cities, an urban kaleidoscope* (p. 193). Routledge.
- Elwell, R. (2004). *Building with light: An international history of architectural photography*. Merrell Publishers Ltd.
- Gilloch, G. (1997). *Myths and metropolis: Walter Benjamin and the city*. Polity Press.
- Katodrytis, G. (2007). The Dubai experiment. In O. Bourman, M. Khoubrou, & R. Koolhas (Eds.), *Al Manakh, a project by C-Lab, AMO, Archis and Moutamarat* (p. 44). Moutamarat.
- Kendall, D. (2022). Other lines: Visualising shifting horizons and atmospheric pollution along the Wirral Peninsula. *Visual Studies*, 37(3), 213–217. <https://doi.org/10.1080/1472586X.2022.2090139>
- Lefebvre, H. (2004). *Rhythmanalysis; space, time and everyday life*. Continuum.
- Lynch, K. (2010). The image of the city. In G. Bridge & S. Watson, Sophie (Eds.), *The Blackwell city reader* (p. 37). John Wiley & Sons Ltd
- Marshall Zarazaga, J. (2011). The moving horizon: Landscape scale as an urban device. *Studies in the History of Gardens & Designed Landscapes*, 31(1), 60–73. <https://doi.org/10.1080/14601176.2010.528856>
- Merleau-Ponty, M. (1964). *The primacy of perception and other essays on phenomenological psychology, the philosophy of art, history and politics*. Northwestern University Press.
- Pelizzari, M. A., & Scrivano, P. (2011). Intersection of photography and architecture – Introduction. *Visual Resources*, 27(2), 107–112. <https://doi.org/10.1080/01973762.2011.568142>
- Rancière, J. (2004). *The politics of aesthetics*. Continuum.
- Rose, G. (2022). Introduction: Seeing the city digitally. In G. Rose (Ed.), *Seeing the city digitally, processing urban space* (p. 14). Amsterdam University Press.

- Shields, R. (2003). *Visualcity-on urban visibility and invisibility*. Retrieved August 19, 2022, from <https://sites.ualberta.ca/~rshields/f/Visualicity-rshields.pdf>
- Stulik, D. C., & Kaplan, A. (2013). *Cyanotype: The Atlas of analytical signatures of photographic processes*. The Getty Conservation Institute, J. Paul Getty Trust.

Part IV

Mapping Cultural Landscapes, Vertically



Epistemology of the ‘Laje’: Notes from Favela Rooftops

14

Bianca Freire-Medeiros and Leo Name

Laje [Uncertain origin]

Feminine noun.

Construction. Continuous work of reinforced concrete, which constitutes a two-story house, the ceiling of a compartment, or its floor.

—Novo Dicionário Aurélio da Língua Portuguesa (Holanda, 2022, online).

Opening the Closet, Climbing (on)to the Laje

The most known dictionary of Brazilian Portuguese provides a definition that covers certain technical aspects of what ‘laje’ means. However, such formal definition is far from encompassing the plurality and diversity of values that a *laje* comprises. In the context of certain *favelas*, which have very high population density, a *laje* is, *at the same time*, a rooftop, slab, floor, path, and a belvedere. A place that since its construction is understood as provisional, ever-changing, and presenting multiple uses (Klintowitz, 2008; Freire-Medeiros, 2009a, 2013). Owning a *laje* is a symbol of status and enviable privilege (Silva & Barbosa, 2005).

A previous version of this chapter was published in Portuguese in *Tempo Social*, 31(1), 153–172, 2019. <https://doi.org/10.11606/0103-2070.ts.2019.151262> The authors thank the journal for granting permission for publishing it here. This study was financed in part by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Brasil (CAPES) - Finance Code 001.

B. Freire-Medeiros (✉)
Department of Sociology, University of São Paulo (USP), São Paulo, Brazil

L. Name
Faculty of Architecture, Federal University of Bahia, Salvador, Brazil

In the verticalized *favelas* of the prestigious southern region of the city of Rio de Janeiro, but not exclusively there, it is on the *lajes* that children play, families have barbecues and celebrate their big events, relax and sunbathe—it is not by chance that so many plastic pools and showers are found there. The *lajes* also fulfil more pragmatic functions: they house the water tanks that paint the aerial view of the *favela* blue, are sewn together with endless clotheslines (Figs. 14.1, 14.2, and 14.3), function as hanging gardens and spaces to raise small animals—dogs, chickens, birds, rabbits, ducks.¹ The *lajes* are also used to store everything that is not useful at the moment, but that are worth keeping. Sometimes they can function as stages for musicians and amateur artists, or as venues for parties and dances, and their walls can be transmuted into screens for film projection.

‘Epistemology of the *laje*’ makes an obvious reference to Eve Kosofsky Sedgwick’s (1993) *Epistemology of the closet*, one of the most powerful texts in queer theory. Sedgwick turns the spatial metaphor of the ‘closet’, in the common sense related to the concealment/revealing of homosexuality, into an analytical device to examine what she calls the “metonymic chain of binarisms” (Sedgwick, 1993, p. 32). On the one hand,

¹The music video for the song *Vai, malandra*, by Brazilian singer Anitta, by the way, takes all of this as a reference.



Fig. 14.1 The *laje* and its multiple uses versus the heliport at the 34-story cylindrical building that was designed by Oscar Niemeyer and features landscaping by Burle Marx, both internationally acclaimed names. Its first opening was in 1972, when Favela da Rocinha was still a medium-sized community, and the hotel enjoyed years of glory during the 1970s and 1980s. When the photo was taken and for two decades (from 1995 to 2016), the hotel was out of business. (Source: Freire-Medeiros, 2012)

public/private, privacy/exposure, and knowledge/ignorance are pairs that are juxtaposed in the geographies of subjects who are treated as inferior because their desires do not fit into compulsory heteronormativity.² On the other hand, the false homosexual/heterosexual opposition, which finds in the closet the expression of homophobia, influences other pairs of Western culture: male/female, majority/minority, natural/artificial, health/disease, same/different. It is in the face of these and many other structural inequalities that Sedgwick designates such meanings which ema-

nate from the act of making oneself known—that is, of coming clean, “coming out of the closet”—as a transgressive epistemology.

‘Epistemology’ refers to any notion, concept, or idea that designates what is considered valid knowledge (Santos & Meneses, 2009). It also “concerns how knowledge *should* be produced, who *should* be authorized, how presumptive credibility *should* be distributed” (Alcoff, 2011, pp. 69–70, *italics in the original*). Therefore the international division of intellectual labour and the geopolitical cartography of production, circulation, and legitimization of knowledge, whether academic or not, should be seen as the result of inequalities that support the agendas and canons of scientific production (Mignolo, 2002; Alatas, 2006; Connell, 2007). Depending on where they

²For a geographical analysis of Sedgwick’s work and a discussion of the materiality of the “closet” in contemporary urban spaces, at different scales, see Brown (2000); Name and Freitez Carrillo (2019).



Fig. 14.2 On the *laje* to the left, a shower and a clothesline. On the other one to the right, a laundry sink, some potted plants and an access door. Around and above them, white flexible pipes and the typical blue suspended tanks, both installed by residents, provide the informal infrastructure for the supply and distribution of water. In the background, the steep slopes of the hills vertically and horizontally occupied by buildings that have been mostly self-constructed. (Source: Freire-Medeiros, 2012)

are produced, theories and concepts reach very different levels of recognition.

Ananya Roy (2011) addresses some of these “itineraries of recognition” of the urban formation ‘slum’, which carries the heavy burden of representing any and all territories associated with poverty. Roy invites us to change the Euro-American lens of urban theory through which “rich” and “poor” territories appear as distinct places, captured in a mirror game that defines them as opposites. Wealth/poverty, formality/informality, legal/illegal etc. are constantly (re)combined to produce hierarchies between areas, ways of building, and ways of living. Whether demonized as spaces of precarity and barbarism or celebrated as *loci* of what the market calls a root entrepreneurship,

slums/townships/*favelas* are constantly encapsulated in the rhetoric of dualisms.

The *laje*, empirically and conceptually, allows for epistemic shifts that challenge such dualisms. In the next section we address the first shift, which is related to the mobility of people, images, and goods—with their interruptions and obstacles—that converge towards the *favela* and are projected from it in multiple directions (Freire-Medeiros, 2009a, 2009b, 2013). If mobility is a resource whose uneven distribution reflects, reinforces, or destabilizes the structures and hierarchies of race, gender, class, nationality (Hannam et al., 2006; Sheller & Urry, 2006; Urry, 2007), what are the analytical effects that emerge when we consider the favela rooftop as a mooring?



Fig. 14.3 Another angle of the *laje* with the clotheslines, showing its location below and alongside other constructions. (Source: Freire-Medeiros, 2012)

After discussing the mobility, immobility, and verticality that concern the *laje*, in the following section we place it as a central element of design in an ontological sense (Gutiérrez Borrero, 2015, 2020; Escobar, 2016). As a result of reflections on the geopolitics of knowledge in architecture, urban and landscape design (Name & Freitez Carrillo, 2019; Name & Moassab, 2020a; Name, 2020, 2021), this second displacement provokes tensions in other dualisms related to constructions—and which can be synthesized in the opposition between expert and non-expert architectures.

Another dualism, however, deserves special attention. The *laje* is a constructive element present in self-made constructions that, especially in the context of Rio de Janeiro, share the landscape with affluent neighbourhoods. Then, how can we conceptualize urban formations that occupy large areas horizontally and at the same time increase verticality in territories associated with poverty,

precariousness, and violence while mingled with the “formal” city?

The *Laje* and Its Forms of Mobility

As Brazilian sociologist Licia Valladares (2005) points out, the *favelas* are numerous and heterogeneous. Despite this plurality, the *favela* present in the imaginaries about the megacities of the Global South is part of a specific standard landscape: always precarious dense buildings built along and on top of steep slopes; sometimes located between the sea and the forest, but always embedded in their supposed counterpoint: the “formal city” (Freire-Medeiros, 2013; Freire-Medeiros & Name, 2015; Name & Freire-Medeiros, 2017). Captured in this geography of imagination, *laje* can be converted into a tourist viewpoint from where ‘gringos’ apprehend, cam-

era in hand, the spectacle of social inequity (Freire-Medeiros, 2013).

The official estimate is that, in urban areas alone, there are around 1 billion people living in inadequate housing conditions. In Latin America and the Caribbean, 30% of the inhabitants live in “informal settlements”. Such informality, however, is not exclusive to those territories, which the State labels as “spaces of exception” (UN, 2005; Menega, 2009; Moassab, 2020; Name, 2020). Based on the assumption that poverty/informality/illegality are synonyms, there is a “valorisation of elite informalities and the criminalisation of subaltern informalities” (Roy, 2011, p. 233).³ The magnitude of the numbers and the lack of classification precision inspire interpretive categories, which organize the time and space of the city as opposed to the time and space of the *favela*. However, “in a territory where zones of exception proliferate”, Ananya Roy wonders, “what then is the city?” (Roy, 2011, p. 234). If the *laje* does not allow us to answer this question, it at least helps us face it.

The Brazilian anthropologist Roberto DaMatta (1991) argues that there are two complementary and opposing logics to structure and define Brazil as a nation. At one end, the code of the home—founded on family and loyalty, resistant to change and to history, a space of the *person* par excellence. At the other, the code of the streets—a space of the *individual* open to the market and to linear history, governed by universal laws. DaMatta adds a third code to these two, which the anthropologist believes to be under the ‘other world’ category, which are the provisional synthesis of the other two—a fusion constructed through the ritualized renunciation of the contradictions and injustices of *this* world (de Souza, 2000). For us, the *laje* is a *mooring* from which we can see mobility circuits that reconfigure what is synthesized, in a certain tradition of Brazilian

social thought, in the private/public antinomic pair.

DaMatta’s model of cognition is particularly suggestive to us because it is based on a connection between social relations and places, between the *public sphere* and the *public space*; and in an interpretation of Brazil whose “secret lies in the possibility of studying what is between things”⁴ (DaMatta, 1991, p. 23). The apparently oppositions begin to reveal their interdependence in the observation of connectives and conjunctions. Hence the author’s suggestion that we observe with due attention what he calls subspaces—squares, backyards, ports, windows, balconies—in which communication between the home and the street becomes possible, mandatory, or desirable. Although *laje* is absent from the anthropologist’s list, we should experience it as a “peculiar subspace” (DaMatta, 1991, p. 26).

Access to the *laje* is usually via stairs that start at street level and are external to the house itself (Fig. 14.4). An unwritten yet highly regarded rule stipulates that one must not climb these stairs and reach someone’s *laje* without proper invitation or authorization. In this sense, we are talking about a private space, the limits of the “home” in DaMatta’s terms. On the other hand, although this limited physical access at street level reinforces their private status, the *lajes*, in their verticality, are both physically and visually connected with the outside, with the public space.

Another type of mobility permitted by the *lajes* is the physical one, and it is even more interesting because it makes us rethink the “home & street” model proposed by DaMatta and takes us closer to Sedgwick’s “metonymic chain of binarisms”. The dimensions of the streets in the *favelas*, in most cases, are beyond any reasonable specification. In addition to being narrow, the streets have very slippery and steep sections; in other parts, they are intersected by stairs. It becomes impracticable, therefore, to transport objects of greater volume—a refrigerator or a sofa, for instance. To get around this serious and everyday mobility problem, residents create

³For a comprehensive analysis of the principles and historicities that, in the Brazilian case, allow for the semantic equivalence between poverty, informality, illegality, and criminality, the work of Vera da Silva Telles is an unavoidable reference. See, in particular, Telles (2010, 2013).

⁴In Portuguese: “o segredo jaz na possibilidade de estudar aquilo que está entre as coisas” (DaMatta 1991: 23).



Fig. 14.4 The stairs are external to the house and depart from the street level. The lower floor ceiling gives access to the house door, preceded by a clothesline. To the left, tourists walk along the “street” established by the slab of another building. To the right and at the back, other stairs give access to another *laje*. (Source: Freire-Medeiros, 2011)

alternative vertical and horizontal paths above the houses. On and between the *lajes*, ‘suspended streets’ are made, which do not need a previous layout or any logic other than pure pragmatism (Fig. 14.5). When used in this way, should we think of *lajes* as home or street, private or public, the result of verticality or horizontality?

Lajes become, even more often, the ends of invisible and precarious bridges when children play and—especially boys—chase kites, jumping quickly between *lajes* that are not necessarily contiguous (Figs. 14.6 and 14.7). However, not all persecution in the *favela* is playful. *Lajes* are also spaces of criminal activity and police intervention. It is from the top of *lajes* that the armed gang members observe and control the flow of people and goods that go in and out of the territory they believe to be theirs.

Suspended streets, bridges, and escape routes: if at an individual and horizontal level the *lajes* are a private space—i.e. home—their collective, vertical, mobile, and varied use transforms them into a public circulation area—i.e. street. This does not mean ignoring that the *laje*’s usage is usually related to the notion of private property and that *lajes* do not always establish or create a positive relationship with mobility, accessibility, and movement. When we say ‘public’, we are referring to a notion of accessibility that is in line with the notion of mobility, meaning the guaranteed wide circulation of people, products, and ideas.

The *lajes* have gained another function since the beginning of the 1990s, and it stems from the popularity of the *favela* in the international tourist market. As mentioned above, in some Rio



Fig. 14.5 Foreground: due to the proximity between the *lajes* it is possible to use them as a suspended circulation path (on the right, a frame of joists indicates that a new *laje*/stretch is under construction). Background: towers of high-end buildings, one of them with a helipad, make up the landscape. (Source: Freire-Medeiros, 2009)

favelas tour agencies bring tourists to a *laje* as an informal viewpoint of sorts (Fig. 14.8). While in the *laje*, facing the ocean, tour guides explain about the *favela* and Brazilian society, answer questions, and encourage tourists to take as many photographs as possible (Freire-Medeiros, 2013). With the patchwork of brick houses and exposed rebar at their feet, visitors can contrast the poorly aligned houses of the *favela* with its surrounding buildings, many of them ostensibly luxurious. Photographs and videos then circulate globally.

If in an ideal plan the *laje* could function as a stage for face-to-face meetings between tourists and local residents, in practice they function as a stage for encounters between tourists and often decontextualized, highly reproduced and circulated, images and narratives. In this sense, *lajes* are part of a visual culture of images showing cities and landscapes seen from above, which we

are increasingly used to seeing and with which we are increasingly engaged, brought to our screens by apps and other media (Bratchford & Zuev, 2021).

Despite the oversimplified narratives and clichés attempting to confine it, the destabilizing power of the *laje* is also present in the tourist *favela*: it is no longer the residents who explain the *favela* or the city, but it is the continuum *favela-city*, seen from the top of the *laje*, what materializes the profound inequality that defines Brazil as a nation in the international imagination. This is how the *laje* allows foreign tourists to decipher what they believe to be Brazil!

Going back to DaMatta's essay, we could say that, in the communication it establishes between global and local, the *laje* does not evoke 'another world', it does not deny the ills and sufferings of



Fig. 14.6 Two boys play among slabs, water tanks, rebar and metal and fibre cement tiles. In the background, a clothes-line and pay TV antennas. (Source: Freire-Medeiros, 2009)



Fig. 14.7 A boy rescues his kite on the *laje* of an eight-story building. In the background, the sea and the green mountains of the South Zone of Rio de Janeiro. (Source: Freire-Medeiros, 2009)



Fig. 14.8 Camera in hand, a white woman tourist uses the *laje* as a viewpoint to photograph the multi-story buildings with apparent pipes, tanks, beams, and bricks. On the short wall that serves her as a guardrail, there is a makeshift pipe fixed with mortar. (Source: Freire-Medeiros, 2009)

the present. The *laje* is a viewpoint of this world of transnational flows, open contradictions, fractures, and turbulences. The *laje*, as a point of observation and connecting bridge of different scales, horizontalities and verticalities, demands an epistemic repositioning of our analytical approaches and constructive intervention, not only in relation to the *favela* but also to the city and the contradictions that constitute them.

In the next section we will address such repositioning.

The *Laje* as Non-expert Design

The Brazilian architects Name and Moassab (2020a, 2020b), following the decolonial epistemology (Lander, 2005; Mignolo & Escobar, 2010), have been pointing out that the construc-

tion systems, morphologies, and modern typologies have become hegemonic, among other factors, because they were geo-historically imposed. This imposition occurred in parallel with the destruction of urban sites, the extinction or resignification of autochthonous spatiotemporal conceptions, and the obliteration of other tectonic and aesthetic knowledge (Mignolo, 2010, pp. 219–313). Furthermore, “image”, “good form”, and “walkability” of a “city for people” (Lynch, 1964, 1984; Gehl, 2013) are idealized based on image, form, experiences, and people of large urban centres in Europe and the United States, diminishing the aesthetic and tectonic specificities of each place.

It is not by chance that the *favelas*—in much of the literature and the discourse of specialists—are also called irregular settlements, invasions, or subnormal agglomerations; and their

self-made constructions are numerous times presented as a social and environmental, aesthetic and constructive threat: ugly, dirty, poorly built, unhealthy, unsafe, and illegal, the place of idleness and marginality waiting for improvements and restructuring and/or control and suppression (Abreu, 1997; Sevcenko, 1998; Novaes, 2014; Rodrigues, 2016). Understood based on the absence of planning or construction rationality, they are a problem to be solved (Bueno, 2000; Compans, 2003, 2007; Maricato, 2003; Cardoso, 2007).

The *laje*, however, invites us to distrust the tacit acceptance that the self-made constructions of which it is a part are the work of chance or lack of knowledge. And it encourages us to reflect on the one hand, on the validity of knowledge related to architecture in the *favelas*, which, made by ‘laymen’, is usually disregarded as a result of design; and on the other hand, on the limitation of the knowledge of specialists responsible for this inferiorization.

Anthropologist Arturo Escobar (2016) and designer Alfredo Gutiérrez Borrero (2015, 2020), Colombian intellectuals deeply engaged with decolonial discourse, have invested in the deconstruction of the notion of design. Debating the multidimensionality of the term, they ask about who is authorized to design, what is designed, why, for whom, and for what. And they inform us that modernity-coloniality was and has been a “design of elimination” in favour of the social production of the non-existence of some. Industrial design, with a specific and somewhat hermetic graphic language, is understood as technical, neutral, and universal: the only possible design, even if it prioritises Euro-American languages and tastes, meets the interests of white-bourgeois elites and does not respect the natural limits of the planet.

Specifically, design in architecture and urbanism, as taught and learned in most universities, is a conception that freezes time and cuts space through static visual representations. The technical drawings produced during the process eliminate the enjoyment of the experience of architecture and of the city—time, three-dimensionality, and movement, conceiving them

as objects whose operation is predefined on the drawing board or computer screen. In these graphic pieces, on the one hand, considering the objects represented, only their position in space, their contours, and their measurements are of interest; and on the other hand, what is meant to be built three-dimensionally is represented bidimensionally, almost never considering the accumulation of knowledge of those who will actually erect the building (Berque, 1999; Baltazar, 2012, 2020; Lara, 2018; Name, 2021).

Although digital tools have expanded possible perspectives, even with simulations of itineraries between spaces, the result remains anchored in a geometrically exact technique. The fact that these devices allow the apprehension of details that escape the human eye, expanding the impression of a three-dimensional hyper-realism, does not prevent them from being anchored by Cartesian projections—and therefore two-dimensional, with no verticality, which are reproduced and manipulated on flat supports (paper sheets, digital screens).

As already observed by the Venezuelan architect Oswaldo Freitez Carrillo (2019), among others, in professional construction sites such drawings are hardly understood by workers—which further contribute to their knowledge and ways of building being considered inferior or insufficient. But it is these “laymen” who actually erect the buildings, who make many of the modifications, adaptations, and future additions to the constructions—that is, they are responsible for new horizontalities and verticalities that practical, daily uses require.

Whether in *favelas* or not, such adaptations and additions, so characteristic of self-made construction in Brazil, are carried out based on the needs of the present and, as we have seen, are inherent to the *lajes* conceived as an architectural element expandable in all directions: the exposed rebars, sometimes signalled and protected by PET bottles, usually signal those new stories are yet to come (Fig. 14.9). However, the *laje* is not perceived by experts in architecture and urbanism as part of a design that gives it an almost infinite spectrum of roles: a space for congregation and socialization, for the enjoyment of non-work



Fig. 14.9 The stirrups indicates an ongoing construction, and that like other *lajes* in favelas, this one is also a potentially mutable and in continuous expansion space. (Source: Freire-Medeiros, 2011)

time. They ignore the wisdom of those who build it aiming at present and future needs, as a basis for a new house to be occupied by other family members, for example.

In *favelas*, as in the rest of the city, individual or collective projects and designs always interact with other projects and designs, which demand processes, choices, and articulations. The *laje* is a design based on a constructive knowledge of non-specialists, continuously projected in a three-dimensional way, it is the result of arrangements and negotiations, which establish a “field of possibilities” (Velho, 1994, p. 28), always open, in which coexistence can be tense.

The *laje*, as a design, leaves as an epistemological lesson the power of landscapes and architectures that are gradually built for the needs of the present; however, considering they enable transformations since their conception, they are also anchored in the future. Furthermore, it makes

us realize that the *favelas* and their *lajes* have their own aesthetics and tectonics: not because they are essentially creative or because they are ontologically opposed to the formal city. Familiarized with fragmentation, movement, and incessant transformation, *lajes* unavoidably show that *favelas* cut both horizontally and vertically through the urban fabric, are found in a more or less explicit way throughout the city, and are differentially triggered by actors at the various rungs of the social life.

Not to Conclude

From the *Epistemology of the closet* one can understand that the ‘closet’ describes relations of knowledge and power that respond to the inconsistency of naming, explaining, and defining the homosexual in hierarchical contraposition to

another invention, the heterosexual (Sedgwick, 1993). The closet combines fixed and mobile elements: its materiality allows you to keep what you want out of sight, but this imprisonment is always unstable. The closet, therefore, is approached by Sedgwick as an analytical operator that thanks to its power to classify, differentiate, and oppose, allows us to map discourses and performativities that are, *at the same time*, amidst the inside and the outside, the mobile and the immobile, the private and the public.

From a *laje*, whose materiality serves as a roof or floor of a building, while others rise next to it either to complement or to affront it, we see the emergence of types of mobility, alternations of use and possibilities of horizontal and vertical expansion of one or several buildings. Because they are always provisional and the result of the coexistence of different wills, the *lajes* compose a landscape that coordinates both the private and the common good. The complexities that we attribute to them here are the result of the accumulation and sharing, in different spaces and over time, of popular knowledge.

We have argued that the *laje* is not only a space worthy of visual-vertical analysis, but also an urban form that allows us to visualize the material and spatial properties from a new epistemic angle. The *lajes* and the *favelas* demonstrate that the patterns of expansion, segregation, and exclusion in many Brazilian cities do not easily fit into the ‘old’ horizontal division between centre and periphery (Burgess, 1924; Harris & Ullman, 1945; Christaller, 1966) or the dichotomy between legal and illegal (Telles, 2010, 2013). Likewise it does not fit into the ‘emerging’ vertical divide that allows the ultra-rich to live high up in luxurious skyscraper penthouses, far from the poverty and chaos experienced by those closest to the ground (Cwerner, 2009; Graham & Hewitt, 2012; Bratchford & Zuev, 2021).

The *laje* also reveals problems in the practice of architects, whose projects for buildings or cities continue to be carried out based on two-dimensional mentalities and practices, and they predetermine uses and activities: a house is designed in the same way as a tool, a garment or a jewel, deeming them as immutable and ignor-

ing necessary transformations—horizontal and/or vertical—of space, and uses, over time. An epistemic blindness that prevents culturally informed and singular demands from being met by more interesting and complex spatial arrangements that prevent the architecture and the city itself from being understood through the multidimensionalities of their spatiotemporalities.

As in Ananya Roy’s critique of subaltern urbanism, it was not our intention here to make an excuse for precariousness. In the buildings of a *favela*, precariousness results from a lack of resources and infrastructure, and not from the construction methods and knowledge implemented or from their solutions and elements of design—such as the *laje*, which simultaneously triggers fruition, horizontality and verticality, leisure, and contemplation. We understand *laje*, thus, in the context of an ‘epistemic disobedience’ as ‘design disobedience’ (Mignolo, 2009; Name, 2021): *laje* is the result of design, or rather a ‘design from the South’ (Gutiérrez Borrero, 2015, 2020), which resists the imposition of modern-colonial technical-scientific rationalities. No wonder the *laje* is largely ignored in Brazilian architecture schools and barely analysed in the vast field of studies on the *favela*.

From the *laje*, it is also possible to look at the inconsistencies and dualisms of statements, explanations, and definitions of the *favela* as opposed to the city. After all, although throughout this chapter we have outlined impermanence, mutability, and juxtapositions between time and space, public and private, as processes linked to the *laje* and the *favela*, would they not also be characteristic of so many cities around the world that also combine horizontality and verticality, formality and informality, the legal and the illegal, the so-called universal and the so-called vernacular?

References

- Abreu, M. A. (1997). *Evolução urbana do Rio de Janeiro*. Iplanrio.
- Alatas, S. F. (2006). Academic dependency and the global division of labour in the Social Sciences. *Current Sociology*, 51(5), 599–613.

- Alcoff, L. M. (2011). An epistemology for the next revolution. *Transmodernity: Journal of Peripheral Cultural Production of the Luso-Hispanic World*, 1(2), 67–78.
- Baltazar, A. P. (2012). Além da representação: possibilidades das novas mídias na arquitetura. *V!RUS*, 8, 2012, online.
- Baltazar, A. P. (2020). Não existe arquitetura decolonial porque não existe ensino de arquitetura decolonial porque não existe arquitetura decolonial. *Redobra*, 6(15), 121–136.
- Berque, A. (1999). Géogrammes, pour une ontologie des faits géographiques. *L'Espace géographique*, 4, 320–326.
- Bratchford, G., & Zuev, D. (2021). Aerial visibilities: Towards a visual sociology of the sky. *Visual Studies*, 35(5), 402–416.
- Brown, M. P. (2000). *Closet space: Geographies of metaphor from the body to the globe*. London, Routledge.
- Bueno, L. M. M. (2000). *Projeto e favela: metodologia para projetos de urbanização*. PhD Thesis, São Paulo Universidade de São Paulo.
- Burgess, E. (1924). *The growth of the city: An introduction to a research project* (Vol. 18). Publications of the American Sociological Society.
- Cardoso, A. L. (2007). Avanços e desafios na experiência brasileira de urbanização de favelas. *Cadernos Metrópole*, 17, 219–240.
- Christaller, W. (1966). *Central places in Southern Germany*. Prentice-Hall.
- Compans, R. (2003). A regularização fundiária de favelas no Estado do Rio de Janeiro. *Revista Rio de Janeiro*, 9, 41–53.
- Compans, R. (2007). A cidade contra a favela: A nova ameaça ambiental. *Revista Brasileira de Estudos Urbanos e Regionais*, 1(9), 83–99.
- Connell, R. (2007). *Southern theory*. Polity.
- Cwerner, S. (2009). Helipads, heliports and urban air space governing the contested infrastructure of helicopter travel. In S. Cwerner, S. Kesselring, & J. Urry (Eds.), *Aeromobilities* (pp. 225–246). Routledge.
- DaMatta, R. (1991). Espaço—casa, rua e outro mundo: o caso do Brasil. In *A casa e a rua: espaço, cidadania, mulher e morte no Brasil*. Guanabara Koogan.
- Escobar, A. (2016). *Autonomía y diseño*. Universidad del Cauca/Sello Editorial.
- Freire-Medeiros, B. (2009a). *Gringo na laje: produção, circulação e consumo da favela turística*. FGV Editora.
- Freire-Medeiros, B. (2009b). The favela and its touristic transits. *Geoforum*, 4(40), 580–588.
- Freire-Medeiros, B. (2011). "I went to the City of God": Gringos, guns and the touristic favela. *Journal of Latin American Cultural Studies*, 20, 21–34.
- Freire-Medeiros, B. (2013). *Touring poverty*. Routledge.
- Freire-Medeiros, B., & Name, L. (2015). 'Peace, love & fun': An aerial cable car and the traveling favela. In J. Cidell & D. Prytherch (Eds.), *Transport, mobility, and the production of urban space* (pp. 263–280). Routledge.
- Freitez Carrillo, O. (2019). Desenhando com o subalterno. *Epistemologias do sul*, 3(1), 166–179.
- Gehl, J. (2013). *Cities for people*. Island Press.
- Graham, S., & Hewitt, L. (2012). Getting off the ground: On the politics of urban verticality. *Progress in Human Geography*, 37(1), 72–92.
- Gutiérrez Borrero, A. (2015). El Sur del diseño y el diseño del Sur. In B. de Sousa Santos & T. Cunha (Eds.), *Actas Colóquio Internacional Epistemologias do Sul: aprendizagens globais Sul-Sul, Sul-Norte e Norte-Sul*. Centro de Estudos Sociais.
- Gutiérrez Borrero, A. (2020). Ressurgimentos: suis como desenhos e desenhos-outros. *Redobra*, 6(15), 265–288.
- Hannam, K., et al. (2006). Editorial: Mobilities, immobilities and moorings. *Mobilities*, 1(1), 1–22.
- Harris, C. D., & Ullman, E. L. (1945). The nature of cities. *Annals of the American Academy of Political and Social Science*, 242, 7–17.
- Holanda, A. B. (2022). *Dicionário Aurélio*. Positivo Editora.
- Klintowitz, D. C. (2008). A (re)invenção da praça: A experiência da Rocinha e suas fronteiras. Ms. Thesis, Campinas, Pontifícia Universidade Católica de Campinas.
- Lander, E. (Ed.). (2005). *A colonialidade do saber: eurocentrismo e ciências sociais*. Perspectivas latino-americanas. Clacso.
- Lara, F. (2018). Teorizando o espaço das Américas: possíveis saídas para séculos de exclusão e de esquecimento. *América*, 1, 66–75.
- Lynch, K. (1964). *The image of the city*. MIT Press.
- Lynch, K. (1984). *Good city form*. MIT Press.
- Maricato, E. (2003). Metrópole, legislação e desigualdade. *Estudos avançados*, 48(17), 151–166.
- Menega, E. (2009). Crise urbana na atualidade: indagações a partir do fenômeno da concentração espacial dos pobres em assentamentos ilegais. In *Encarte Clacso: Cadernos da América Latina*. Clacso.
- Mignolo, W. D. (2002). The geopolitics of knowledge and the colonial difference. *The South Atlantic Quarterly*, 1(101), 57–96.
- Mignolo, W. D. (2009). Epistemic disobedience, Independent thought and decolonial freedom. *Theory, Culture & Society*, 26(7–8), 159–181.
- Mignolo, W. D. (2010). *The darker side of the Renaissance*. University of the Michigan Press.
- Mignolo, W. D., & Escobar, A. (Eds.). (2010). *Globalization and the decolonial option*. Routledge.
- Moassab, A. (2020). O projeto pedagógico do CAU Unila, a América Latina e o século XXI. In A. Moassab & L. Name (Eds.), *Por um ensino insurgente em arquitetura e urbanismo* (pp. 33–58). Edunila.
- Name, L. (2020). Paisagens para a América Latina e o Caribe famintos: paisagismo comestível com base nos direitos humanos e voltado à justiça alimentar. In A. Moassab & L. Name (Eds.), *Por um ensino insurgente em arquitetura e urbanismo* (pp. 349–365). Edunila.
- Name, L. (2021). Coloniality and decoloniality analytics: Some basic spatial dimensions in architecture. *Pós FAUUSP*, 28(52), e168263.
- Name, L., & Freire-Medeiros, B. (2017). Teleféricos na paisagem da 'favela' latino-americana: mobili-

- dades e colonialidades. *GOT: Revista de Geografia e Ordenamento do Território*, 11, 263–282.
- Name, L., & Freitez Carrillo, O. (2019). Cartografias alternativas decoloniais: gênero, sexualidades e espaços em uma universidade em área transfronteiriça. *Arquitectos*, 20(230.02).
- Name, L., & Moassab, A. (2020a). Apresentação. In A. Moassab & L. Name (Eds.), *Por um ensino insurgente em arquitetura e urbanismo* (pp. 13–31). Edunila.
- Name, L., & Moassab, A. (2020b). Por um ensino de paisagismo crítico e emancipatório na América Latina: Um debate sobre tipos e paisagens dominantes e subalternos. In A. Moassab & L. Name (Eds.), *Por um ensino insurgente em arquitetura e urbanismo* (pp. 336–348). Edunila.
- Novaes, A. R. (2014). Favelas and the divided city: Mapping silences and calculations in Rio de Janeiro's journalistic cartography. *Social & Cultural Geography*, 2(15), 201–225.
- Rodrigues, L. (2016). Os mapas jornalísticos sobre as Unidades de Polícia Pacificadora como representação visual do favelismo. *Espaço e Cultura*, 39, 179–204.
- Roy, A. (2011). Slumdog cities: Rethinking subaltern urbanism. *International Journal of Urban and Regional Research*, 2(35), 223–238.
- Santos, B. S., & Meneses, M. P. (2009). Introdução. In B. S. Santos & M. P. Meneses (Eds.), *Epistemologias do Sul* (pp. 9–19). CES.
- Sedgwick, E. K. (1993). *Epistemology of the closet*. University of California Press.
- Sevcenko, N. (1998). A capital irradiante: técnica, ritmos e ritos do Rio. In N. Sevcenko, & F. A. Novais (Eds.), *História da vida privada no Brasil: República, da Belle Époque à Era do Rádio* (Vol. 3, pp. 513–619). Companhia das Letras.
- Sheller, M., & Urry, J. (2006). The new mobilities paradigm. *Environment and Planning A*, 2(38), 207–226.
- Silva, J., & Barbosa, J. L. (2005). *Favela: Alegria e dor na cidade*. Senac-Rio.
- Souza, J. de. (2000). A sociologia dual de Roberto DaMatta: descobrindo nossos mistérios ou sistematizando nossos autoenganos? *Revista Brasileira de Ciências Sociais*, 45(16), 47–67, fevereiro.
- Telles, V. S. (2010). *A cidade nas fronteiras do legal e ilegal*. Argumentum.
- Telles, V. S. (2013). Prospectando a cidade a partir de suas margens: notas inconclusas. *Contemporânea: Revista de Sociologia da UFScar*, 3(2), 359–373.
- UN. (2005). *Press briefing by special rapporteur right to adequate housing*. <https://www.un.org/press/en/2005/kotharibrf050511.doc.htm>
- Urry, J. (2007). *Mobilities*. Polity.
- Valladares, L. P. (2005). *A invenção da favela: Do mito de origem a favela.com*. FGV Editora.
- Velho, G. (1994). *Projeto e metamorfose: antropologia das sociedades complexas*. Zahar.



Rio's "Natural Born Monument": Visual Imaginaries of The Sugarloaf Mountain

15

Jorge de La Barre

*The Sugarloaf is the city's natural born monument.
It does not need to be registered or have any other formality
that attests to its condition. It is in its face, as they say.
However, a huge building with an extensive façade
and 13 stories is appearing in front of it,
visible from Praça Paris and Flamengo Park,
in a scandalous mockery of the Carioca population.*

—Lúcio Costa, “It's a Crime Against Rio,” 1971

“The Sugarloaf is the city's *natural born monument*”: so began Lúcio Costa's opinion article titled “It's a Crime Against Rio,” in the *O Globo* daily on June 2, 1971 (Costa, 2009, p. 95—emphasis in original). The famous Brazilian architect and urban planner denounced the recent construction of a 13-story building at the foot of Sugarloaf for being an affront, to Rio's natural landscape and the *Carioca* population all the like.

In this article, I explore mainly the Sugarloaf Mountain and other visual aspects of the “Marvelous City.” The focus is on the contemporary experience in the context of the recent urban renewal process carried out to receive the sports mega-events of 2014 and 2016. As a visual chapter, the narrative was built primarily from diverse images, photographs, and other visual representations such as projected images on buildings and monuments. Essentially, the presentation follows three moments or movements, all carrying the same Sugarloaf as a starting point. With those three mo(ve)ments, I take the following steps:

“seeing the view”; “selling the view”; and then “virtualizing the view.”

Step 1: “Seeing the View”

The title of this first step was inspired by a 1998 piece called “Eu só vendo a vista,” by visual artist Marcos Chaves (Fig. 15.1).

The piece lies on the ambiguity regarding the semantic content displayed on the banner, “Eu só vendo a vista,” which can mean “I, just seeing the view”; or “I'm only selling the view”; or again “I'm only blindfolding the view.” Marcos Chaves' piece was part of the inaugural exhibition for the Museu de Arte do Rio (MAR) in 2013, aptly titled *Rio de imagens: uma paisagem em construção* (*Rio of Images: A Landscape Under Construction*—Herkenhoff, 2013). The exhibition was conceived as a celebration of the Marvelous City, through its diverse painted and photographic landscape representations over the centuries. As for the cover for the exhibition poster and catalog, it showed one of the first photographic records of the Sugarloaf Mountain, by Augusto Malta in 1910 (Fig. 15.2). From photographic pioneers like Marc Ferrez or Augusto

J. de La Barre (✉)
Department of Sociology, Universidade Federal Fluminense, Niterói, Brazil



Fig. 15.1 “Eu só vendo a vista,” by visual artist Marcos Chaves. Photo collaboration: Vicente de Mello. (Source: <https://www.artsy.net/artwork/marcos-chaves-eu-so-vendo-a-vista>)

Malta to Marcos Chaves (or Vik Muniz as we shall see), the Sugarloaf will have traversed the various and different ages of modern photographic means of representation and visual communication. Since the age of photographic reproduction, the Sugarloaf has in fact remained Rio’s most iconic “natural born monument.”

Rio’s landscape was constructed, signified, and represented during at least three centuries prior to the advent of photography. The aim of the *Rio de Imagens* exhibition was precisely to display the progressive consolidation of Rio’s visualities through diverse forms of representation, where the Sugarloaf came to gain eventually the status of a modern, yet natural, icon. Before photography pioneers like Marc Ferrez or Augusto Malta, many *visual essays* (paintings, drawings, croquis...) certainly contributed in fixing the imagined reality of the

Carioca landscape, just as its visual language and grammar. If Rio’s landscape and visual culture were already consolidated when photography arrives, perhaps the first black and white prints convey also an enduring imaginary line that goes back to the first captures of the sunlight, the nature and the view, as seen in classic Dutch School art paintings by Albert Eckhout (1610–1665) or Frans Post (1612–1680), or the works of Jean-Baptiste Debret (1748–1868) during the 1816 French Artistic Mission to Brazil. An imaginary line that still goes on today, making sure that any seasoned viewer of such wondrous skies would transport back into some unknown, imagined past, in a strange and delicious sensation of *déjà vu*.

Thus, there is, initially with painting, a visual and semantical sedimentation of Rio’s landscape, which is already by nature, a vertical landscape.

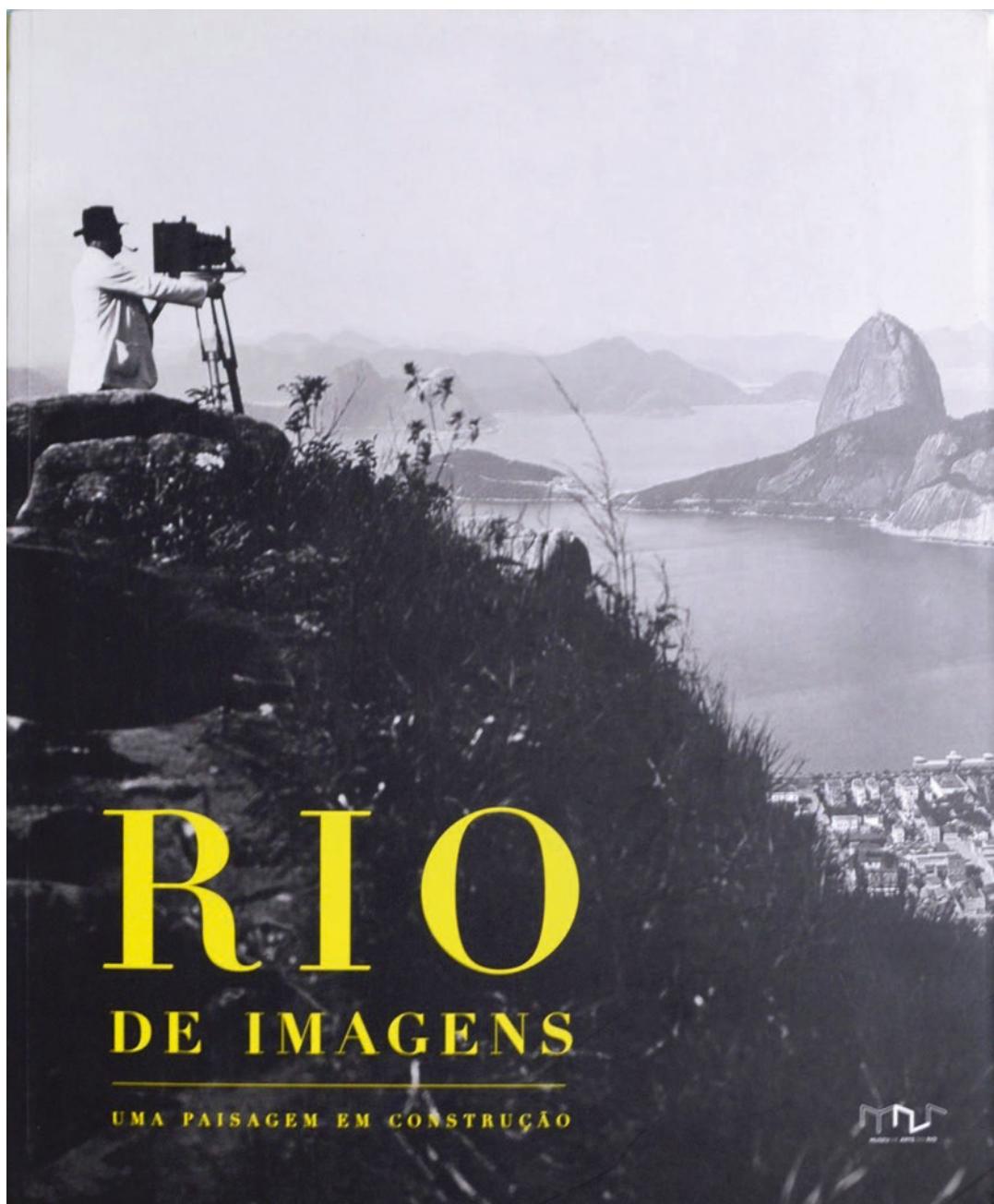


Fig. 15.2 Catalog cover for the MAR's inaugural exhibition in 2013, *Rio de Imagens: Uma paisagem em construção*, with a 1910 photograph by Augusto Malta. (Source: <https://museudeartedorio.org.br/publicacoes/rio-de-imagens-uma-paisagem-em-construcao/>)

As a new technique of visual representation, the photography of Rio will quickly spread the scenic visions of verticalized viewpoints to the world—thanks also to the emerging cable car

technique. During the first decades of the twentieth century, shortly after the advent of photography, two major verticalization operations take place in Rio: the inauguration of the Sugarloaf

cable car in 1911, and the construction of the statue of Christ the Redeemer on top of the Corcovado Mountain in the Forest of Tijuca, roughly from 1920 to 1931.

In the *Carioca* (or Rio's) landscape, the Sugarloaf is conceived necessarily in dialogue with its vertical visual double, Christ the Redeemer. We have, the “natural born monument” on the one hand, and the eminently constructed monument on the other. Altogether contemporary to the advent of photography, they become Rio's one and only monument, natural and sacred at the same time; a visual doppelganger, vertically integrated in the Guanabara Bay. By metonymy, the visual double comes to represent Rio as a whole. By extension, it comes to represent Brazil as a whole. Inevitably, the plain simple, crystal-clear lyrics of “País tropical” (“Tropical Country”) come to mind—beautifully imagined by popular singer Jorge Ben in 1969. And behind the lyrics, the imagined visual background as a readymade. Indeed, the *Carioca* codes were all set up already:

*I live in a tropical country,
blessed by God,
and beautiful by nature
(but what a beauty!)*

—Jorge Ben, “País tropical” (1969)

I now want to explore the ways in which photography will only confirm the established representations of a *Carioca* landscape that, although rather fixed already by centuries of painting, was yet to be reframed, resignified in the new medium, thus multiplying its possible applications. Having in mind, the works on “visual consumption” and “landscapes of power” by Sharon Zukin (1991) and the ones on the “tourist gaze” by John Urry (1990), I want also to pay attention to the visual grammars at play, and their possible updates from different perspectives—touristic, mercantile, patrimonial, etc.

Step 2: “Selling the View”

Moving then, from “seeing” to “selling the view,” a good example for such transition seems to be Rio's World Heritage candidacy campaign with

UNESCO (United Nations Educational, Scientific and Cultural Organization). It was launched in 2008 by the IPHAN (Instituto do Patrimônio Histórico e Artístico Nacional), and filed with UNESCO in 2011. Rio won the following year, in the category “Urban Cultural Landscape.” Inevitably, Rio's most scenic panorama over the Sugarloaf and the Guanabara Bay was featured on the cover for Rio's UNESCO candidacy (Fig. 15.3)—a book titled *Rio de Janeiro: Paisagens entre a montanha e o mar* (*Rio de Janeiro: Landscapes Between the Mountain and the Sea*—Ribeiro, 2016).

In a 2007 paper titled “Cultural Diversity as a Global Discourse,” anthropologist Gustavo Lins Ribeiro spoke about the notion of OUV (“Outstanding universal value”), a floating signifier open to the deliberations of international institutions such as UNESCO, to performatively create and endorse whichever “value” was involved in the process itself—here for example, the “Urban Cultural Landscape” category. When Rio was nominated in 2012, the architect and urbanist Raquel Rolnik reminded that the favelas also were an integral part of Rio's urban cultural landscape between the mountains and the sea and, therefore, part also of the World Heritage Site (Rolnik, 2012).

Another award in 2018, Rio de Janeiro was prized by the International Union of Architects and UNESCO. From 2012 to 2018, Rio has been the site for UNESCO's World Heritage as “Urban Cultural Landscape,” then prized as the First World Capital of Architecture. Again, the same view of the Sugarloaf seen from the Aterro do Flamengo and its gardens designed by landscape artist and architect Burle Marx in the foreground was the main stage for such visual representation for the doubly prized city.

With this second step of “Selling the View,” we enter the stage of global culture and cities, fueled by UNESCO awards, international prizes, world exposure and visibility, recognition and inclusion in the emerging global cities networks, etc. In the article mentioned above, Gustavo Lins Ribeiro also spoke about the symbolic economy. That is, a new (e)valuation of the urban, cultural, natural spaces and places, based on their exceptional (if not spectacular) aspects *sui generis*. The



Fig. 15.3 Cover for Rio's candidacy book with UNESCO in the "Urban Cultural Landscape" category: *Rio de Janeiro: Paisagens entre a montanha e o mar* (Ribeiro, 2016). (Source: <https://www.terra.com.br/noticias/paisagens-do-rio-de-janeiro-ganharam-livro-de-arte,04acf6f2f139ba4e3dbe68a414e0887fun1ez8oi.html>)

performative dimension is pretty clear; as we have seen, the emerging category of "Urban Cultural Landscape" has also created in fact, the new reality of it. In this process, the landscape itself gains tremendous symbolic power; it becomes in fact overdetermined by the very play of "cultural diversity as a global discourse," in Ribeiro's own terms.

Countries and cities enter into a symbolic competition, as they aim to produce competitive assets in the context of economic and cultural globalization. Cities join global cities networks. Here also, the emerging discourse of the creative economy tends to perform these cities as creative hubs, with the redefinition and redesign of their traditionally diverse and specific practices and activities—cultural, popular, or handicraft. In such competitive, symbolic redefinition, the visual dimension is paramount as it allows, at least, for a "polishing" of the candidacy in order to precisely increase its visibility. In Rio, both the

natural landscape and its verticality are involved, they are both ranking high on the list of competitive assets. Thus, verticality and visuality become weapons for global visibility. Most definitely, visual performativity is at play in several contemporary processes of urban renewal. It tends to become the utmost significant symbolic resource. Whenever and wherever urban requalification is involved, the visual dimension leads the show—the more vertical the better.

In the context of the 2014 and 2016 sports mega-events, Rio has undergone an important process of urban renewal (La Barre, 2016a, 2016b, 2019a, 2019b, 2019c, 2020). Significantly, the process was also fully immersed in the creative economy, with the launching of the *Marca RJ—Marca Registrada do Brasil*, Brazil's trademark (not just Rio's!), by art director Fabiano Pinheiro in 2011. Since the campaign was also in English, there is no doubt that it was designed globally from scratch, say "for the English to

see” (“Para inglês ver”)—a commonly used expression in Portuguese from Brazil (in the sense of something that is apparent, but not valid or real). Several images have been produced for the *Marca RJ* campaign, all of them suggesting grace and happiness, natural *joie de vivre* in beautiful landscapes and architectural wonders. On each image of the series, one could read a superimposed on the photo, followed by a circled *RJ* sign as a new symbol “registered”—a ® specific to Rio de Janeiro and meaning Brazil by extension. Hence,



Before the sports mega-events of 2014 and 2016, Rio de Janeiro was hosting another kind of mega-event, the *United Nations Conference on Sustainable Development (RIO+20)*, titled after a first edition held 20 years earlier, the *Earth Summit (ECO-92)*. In preparation for which, the Marvelous City underwent, in May 2012, an urban clean-up operation called “Operação Rio Limpo” (“Operation Tidy Rio”)—the removal of nine billboards in Rio’s Centro, and South Zone. The aim was to show the world that no visual pollution could invade the host city, at least not during such an environmentally conscious event as *RIO+20*. Many posters for the *RIO+20* displayed the city’s famous “natural born monument.” Inevitably, the Sugarloaf was featured on the cover for the *RIO+20 Conference Handbook* (Fig. 15.4).

In 1992, Rio had hosted first the *ECO-92*. The People’s Summit was headquartered at Aterro do Flamengo right across the Sugarloaf, allowing for its inescapable appearance in any photograph of the event. The same inescapability of Rio’s “natural born monument” repeated itself 20 years later during *RIO+20* with, on the exact same location, another People’s Summit. Still during *RIO+20*, many photographic coverings of the event staged the Sugarloaf seen from its cable car. Verticalized, the stunning view was being

virtualized also when one of the *RIO+20* posters was captioned with a dreamy proposal: “Cenário para o sonho” (“Scenery for Dreaming”), thus echoing Sharon Zukin’s idea of “dream landscapes” (Zukin, 1991).

Parallel to the *RIO+20* official agenda, several cultural events were taking place in the city. Most notably, the outdoors photo exhibit *A terra vista do céu (Earth from Above)*, by French environmentalist and activist photographer Yann Arthus-Bertrand, was installed downtown at Cinelândia. One of the most circulated photo exhibits worldwide, the idea behind *Earth from Above*, according to Arthus-Bertrand, was to show “the beauty and fragility of planet Earth” (Ortiz, 2012).

Beneath the dream landscapes, behind the scenes of a beautifully displayed global awareness for the environment, *RIO+20* was yet to remind the world of its bad, unsustainable habits to consume in excess—a habit that, if changed rapidly, would end up destroying the planet all the like. A thought-provoking photographic work by Vik Muniz recreated Rio’s most scenic view of the Sugarloaf, redesigned with non-recyclable materials, plastic bottles, and other garbage material (Fig. 15.5).

Now a synecdoche, Rio’s “natural born monument” was staged in plastic, to signify our current unsustainable mass-consuming practices. It is worth noting that prior to *RIO+20*, photographer Vik Muniz was featured in *Wasteland*, a 2010 documentary film by Lucy Walker, which staged Vik’s photographic intervention with the community of garbage collectors located in Rio’s North Zone: Jardim Gramacho. Latin America’s biggest dumping ground, Jardim Gramacho was closed in 2012, before Rio hosted *RIO+20*. More recently, another photographic take of the Sugarloaf by Vik Muniz consists in a cardboard-made replica of Augusto Malta’s most classic panoramic view (as seen above in Fig. 15.2).

Moving on to 2013, another mega-event was taking place in Rio: the *JMJ—Jornada Mundial da Juventude (World Youth Day)*. Rather than sports or the environment, the international Catholic event focused on religious faith and youth—distinct in this sense from *RIO+20* or the

Fig. 15.4 Cover for the *RIO+20 Conference Handbook*, 2012.
 (Source: <https://www.slideshare.net/uncsd2012/rio20-conference-handbook>)



upcoming sports mega-events of 2014 and 2016. Again, the Sugarloaf was featured on several images and posters for the occasion, obviously with its visual partner Christ the Redeemer. Doubly vertical, Rio's incomparable view transcended the entire Brazil one more time, for the whole world to see. Again, the lyrics of Jorge Ben's "País tropical" come to mind—a celebration of Brazilian tropical life; Rio's utmost definitive postcard, and again, Brazil "blessed by God, and beautiful by nature."

On with the 2014 *FIFA World Cup*, now held in 12 Brazilian cities, including of course Rio de

Janeiro. Several pictorial evocations of the Sugarloaf were naturally involved, just as they were also with the *Rio 2016 Olympics*. Depending on the perspective, either the Guanabara Bay with the Sugarloaf in the foreground and Christ the Redeemer in the background or vice versa. Again, Rio's vertical other. A *natural born postcard*, a *natural born logo* indeed. Talking about logos, where did the Rio Olympics visual come from, by the way (Fig. 15.6)?

Recurrently, dreams of Olympic victories were featuring in posters and flyers, the same stunning visual of the Sugarloaf Mountain. And



Fig. 15.5 Rio's most scenic view of the Sugarloaf, redesigned with non-recyclable materials, plastic bottles, and other garbage material, by photographer Vik Muniz, during RIO+20, 2012. (Source: <https://maisfutebol.iol.pt/internacional/rio-20/increivel-imagem-da-baia-de-guanabara-do-rio-de-janeiro-feita-com-lixo-reciclado>)

then eventually, the dream faded away. What was left then after 2014 and 2016, behind the festive and hyper-visible effects of massive economic investments and short returns; behind the social costs of massive population removal—all gently concealed behind the same old postcard of the same old view.... In 2008 already, the visual artist behind “Eu só vendo a vista” (see Fig. 15.1), Marco Chaves, pictured an array of vertical scaffolds in preparation for some mega-event of a kind—a reminder that the *Cariocas* are so familiar with them, if not *blasé*. In Brazil’s most visual/vertical city, especially on the South Zone beaches of Leme, Copacabana, Ipanema, or Leblon (but also in Flamengo or Botafogo), scaffolds are permanently being mounted or dismounted. Staging the Sugarloaf, still in sight through the scaffolds in the foreground, Chaves’ work was ironically titled “Desculpe o transtorno” (“Sorry for the inconvenience”).

In *The Condition of Postmodernity*, David Harvey (1989) wrote about the “maelstrom of destructive creation and creative destruction” as

representing modernity itself, and “the dilemmas that faced the implementation of the modernist project” (p. 16). Harvey asked: “How could a new world be created, after all, without destroying much that had gone before?” (*ibid.*). Further on, Sharon Zukin (1995) spoke of recent operations of urban renewal in terms of “domestication by cappuccino.” In the same vein, one could easily conceive of a process of urban renewal *by mega-events*, or *street art*. In 2013, right across Praça XV in downtown Rio, the pedestrians were forewarned of the upcoming Olympics by freshly painted frescos of running athletes, on the pilons of the Perimetral overpass that was soon to be demolished in order to open the waterfront to pedestrians for visual (and other types of) consumption, connecting the Praça XV boat terminal to the Praça Mauá and beyond, the Olympic Boulevard—all powerful symbols for Rio’s downtown and port area renewal. Perhaps the painted athletes on the pilons were also suggesting a superior Olympic reason for the demolition of the overpass itself; it was clear though, that



Fig. 15.6 An evocation, a “mix,” between the authentic landscape and its reinvention by the *Rio 2016* logo. (Source: <https://filateliahalibunani.com/produto/envelope-fdc-999-olimpiadas-rio-2016-rio-de-janeiro/>)

just as their solid concrete support, they would soon have to go too. Soon enough, the “new” Praça Mauá was ready to host the *2016 Olympics* for the whole world to see; it was opening also its Museu do Amanhã (Museum of Tomorrow) on the waterfront, right across the Museu de Arte do Rio (MAR). The whole port area was going through a major face-lifting. Coincidentally, the “new” Praça Mauá and the Olympic boulevard were ready to be officially inaugurated on the day of the *Rio 2016* opening ceremony. For the occasion, a huge screen and a stage were running the show on Praça Mauá displaying live feeds of the Games, and live concerts were scheduled every night during the event.

The visual dimension was obviously key during the live events (hyper-presence of the world’s televisions, hyper-mediatization of the city as a whole, social effervescence, festive celebration, etc.). Yet, the long and enduring process of urban renewal was also inventing new visualities in the

longer run. Notably, the *Porto Maravilha* operation had not only brought two museums on the “new” Praça Mauá (the MAR and Museu do Amanhã mentioned above), but also the gigantic aquarium Aqua Rio; the Rio Star Ferris wheel; the Olympic Boulevard; and its monumental urban art frescos. As for the transit system, the VLT (Veículo Leve sobre Trilhos, or Light Rail Vehicle) was now connecting the port area to the downtown area, and the Rio 450 tunnel, inaugurated in 2015 for the city’s 450th anniversary, replaced the now demolished Perimetral overpass.

To accompany such major changes in the area’s infrastructures and visualities, a communication operation was designed, carried out by the CDURP (Companhia de Desenvolvimento Urbano da Região do Porto). Significantly, one of the CDURP’s communication strategies consisted in a series of postcards available for free in the local commerce, restaurants and bars, show-

ing the area's most emblematic places *before* and *after* the Perimetral overpass—that is *with*, and then *without it*: Praça XV, the Candelária Cathedral, Praça Mauá, the old Avenida Rodrigues Alves now renamed Boulevard Olímpico. Interestingly, the whole *Before/After* postcards series were captioned with the same text: “Who saw you, who sees you...”—a nod to a Chico Buarque song that spoke about the lost authenticity of the old street samba against its revamped, salon version. If the popular expression “Quem te viu, quem te vê” can have the derogatory sense of someone or something that turns out to be a disappointment, it certainly indicates that the person or thing that is talked about or paid attention to is no longer the same as in the past. Of course, gazing at the postcards, it was not clear who was asking the question—and to whom: the viewer, or the view(ed)? To be sure, when *Before* is no longer (or just a memory), when *After* (i.e., in the context: *Now*) self-justifies for its regained grandeur and visibility, the winner takes all—visual consumption, that is.

There was some irony perhaps, when Sharon Zukin dubbed (at least some forms of) urban renewal as “domestication by cappuccino” (Zukin, 2010). After the new Praça Mauá and the Olympic Boulevard were completed in fact, several food trucks started popping up almost naturally. Likewise, the Olympic Boulevard opened up with its all-included monumental street art frescos lively displayed on the murals and warehouses all the way down to the Rodoviária bus terminal (now that its old Perimetral overpass had been replaced by the Rio 450 tunnel right under the Olympic Boulevard). Said to be the largest in the world, the mural “Etnias” (“Ethnic Groups”—the five continents of the world, represented by five gigantic portraits of their respective indigenous, endangered people), designed by visual artist Eduardo Kobra, was already, definitively, the Olympic Boulevard’s masterpiece. It is also true that its specific location made it particularly hard to miss—right across the Praça Mauá VLT station named “Parada dos Museus” (“Museums Stop”).

The visual dimension also played full on, right in front of the Museu do Amanhã, with the hashtag

#CIDADE_OLIMPICA (soon replaced after the Olympics, by #RIO_TE_AMO), for any selfie needs. Selfies are meant to spread infinitely in the hyper-circulated social networks, so beyond Sharon Zukin’s “cappuccino” so to speak, we would get a virtualization of John Urry’s tourist gaze: domestication by hashtag, or perhaps just: #DOMESTICATION... A perfect spot for selfies too was now the terrace of the MAR, situated on its sixth and last floor where—a must for any museum of the twenty-first century to be sure—a panoramic view can be enjoyed over the new Praça Mauá with the Museu do Amanhã in front, and the Guanabara Bay in the background. More often than not, the process of urban renewal is also one of verticalized aestheticizations, where the main point is to gain a new point of view, precisely. Yet sometimes, depending on the circumstances, the new point of view turns out to be unsustainable.

If the Rio Star Ferris wheel has, since its inauguration in 2019, conquered the hearts of the *Cariocas* who can now enjoy a vertical view over the exact same area where the Perimetral overpass was located, much shorter-lived were the cable cars of Providence Hill, a favela located right behind Praça Mauá, and the one at the favela complex of Alemão, located in the North Zone. Inaugurated in 2014 and 2011, respectively, both cable cars were rapidly discontinued for lack of maintenance after the Olympics and are now in a state of complete abandon. Still, one should remind that Rio’s most sustainable verticalization project—the Sugarloaf cable car—dates back from 1912. Anecdotally, it was also commemorated with a Google doodle for its recent 100th birthday.

Step 3: “Virtualizing the View”

In his recent book titled *La photo numérique: une force néolibérale*, philosopher and photography historian André Rouillé (2020) pointed at the “digital aberrations.” In an era of post-photography and post-representation, Rouillé contended, anything is possible—with a little help from *Photoshop*. Almost 30 years prior in 1992, philosopher and media scholar Régis Debray had proposed, in a book titled *Life and*

Death of Image: A History of the Western Eye, the definition of three ages of the look, or gaze: from icon, to art, to the screen age. If photography and cinema could still be considered in the terms coined by Walter Benjamin in the 1930s, as works of art in the age of mechanical reproduction (Benjamin, 1969). In Debray's view, television was the game changer; we had jumped from representation to simulation. After—or rather, *beyond*—cinema, came TV immersion. Fifteen years or so after Debray in the mid-2000s, Gilles Lipovetsky and Jean Serroy (2007) spoke also of three ages, in a book titled *L'écran global. Du cinéma au smartphone*. Yet, their three ages were of the screens—not the gaze, as in Debray. We had moved from cinema, to television, to the smartphone.

In a 2006 paper titled "Visuality, Mobility, and the Cosmopolitan," John Urry, the author of *The Tourist Gaze*, reflected upon the new and somewhat strange sensation of seeing the world "from afar" (Szerszynski & Urry, 2006). However, what was then envisioned as an increasingly distanced tourist gaze had been in fact previously considered from a rather different, more radical perspective perhaps, by Andrei Codrescu (2001), in a book titled *The Disappearance of the Outside*. According to the cultural critic, the "outside" was the world external to images which was precisely disappearing, as the world itself was now increasingly immersed in a world of images. Now, perhaps the two visions combined—Urry's and Codrescu's—offer a paradox: not only are we fully immersed in an incessant flow of images with no outside at sight; we are also seeing the world from afar, as tourists.

For better or for worse, it is most certainly in cyberspace that these two visions combine the best: the digital(ized) world creates endless opportunities for new narratives to emerge every day. Feelings of estrangement and bewilderment are provided, precisely, by a full immersion in a world of images; also, to be sure, there is no such thing as a "real" image of cyberspace *per se* (i.e., cyberspace can only be represented virtually). Ultimately, with all the GPS and geolocation applications, the virtualization of urban space has

been normalized, beyond all horizontal/vertical coordinates. It has become almost inconceivable it seems, to "escape the overcode" (Holmes, 2009). In other words, the world is now unified under the same rules of cognitive capitalism and symbolic communication, where "imperative models of interaction regulate, standardize and organize" (Weelden, 2010), producing controlled forms of subjectivation and experience.

What can visual artists do? The *animation* of the urban fabric, projecting images on buildings and monuments, is now an integral part of what Rouillé called photographic "aberrations." It is also, the virtualization of our own bodies and identities with all avatars attached and indeed, the built-in surveillance mechanisms that come with the package. When any smartphone morphs into some sort of its owner's digital DNA, hyper-surveillance is just a click—or tap away. From "seeing the view," we switched to "selling the view"; increasingly, we are now "VR-ing the view"—and virtualizing the world.

Now shifting the gaze, with photographer JR's gigantic photo reproductions spreading around the city like street art murals. Beyond, once again Sharon Zukin's "cappuccino," there is possibly an urban renewal by street art and photography where posters and *trompe l'œil* are literally integrated into the urban fabric. In parallel to Kobra's mural "Etnias," inaugurated on the Olympic Boulevard, JR's project "Gigantes" was Rio's Olympics' other visual star: photos of athletes in full force crawling or pole vaulting, displayed on gigantic black and white reproductions covering entire buildings as if they were swimming in Botafogo beach (with the Sugarloaf in the background), or jumping from a building on Aterro do Flamengo (and Christ the Redeemer in the background). Stunning Olympic visualities were merging with the very urban fabric around the Guanabara Bay, at Botafogo beach and Aterro do Flamengo. Let us now return, in a third and last movement, to our view of the "natural born monument," now with a somewhat transformed surrounding environment (Fig. 15.7).

This is the book cover for *A cidade sou eu*, by Rosane Araujo (2011—translated in English in



Fig. 15.7 Flyer for the book launching *A cidade sou eu*, by architect and urbanist Rosane Araujo (2011). Photography and Photomontage: Rosane Araujo. (Source: <https://www.acidadesoueu.com.br/index.php?page=agenda&id=41>)

2013, as *The City Is Me*). The architect and urbanist explored new ways of understanding the relationship between city and personal identity, arguing that there is potentially no longer a separation between city and identity. Rather, we would witness, and participate in the increasingly asserted congruence between subjectivity and city space. For such a naturally visual city as Rio de Janeiro, this would almost seem all too normal. In fact, the *Cariocas* embrace the city, in a fusion of affects with real and imagined geographies. The congruence is even more confirmed now, in the virtual world: with all the selfies feeding the social networks at every second, *I Am the City indeed!*

Rosana Araújo's book cover seems to say it all. Her doctoral thesis in architecture was defended at UFRJ (Universidade Federal do Rio

de Janeiro), titled with the subtitle: *21st Century Urbanism*. In a 2013 book titled *Fantasmagories du capital. L'invention de la ville-marchandise*, sociologist and Walter Benjamin specialist Marc Berdet analyzed the pre-modern, modern, and post-modern "phantasmagorias" of the nineteenth, twentieth, and twenty-first centuries (Berdet, 2013). Yet as it seems, we have now moved beyond phantasmagoria, beyond representation and the spectacle all the like. Our hyper-connectedness only confirms and deepens the experience of space-time compression identified by David Harvey more than 30 years ago (Harvey, 1989).

Now that we have entered the era of simulation, immersion, and virtual reality, have we also moved from "seeing the view" to "selling the view" to just "VR-ing the view"—all immersed

that we are, in virtual reality? Even more so, during the last three years with the Covid-19 pandemic, when the use of videoconferencing applications has increased to such an extent, that StreamYard, Zoom, Meet have become common names and expressions. As Andrei Codrescu (and many more) suggested, we have now *de facto* entered the screens; we now live in the integrated circuits of live networks and online platforms. And yet, natural born or built, all the monuments remain the same. They have been and still are the icons of modern, post, and hypermodern times—the iconic landscapes at the crossroads, between images, imagination and the imaginary. Monuments such as the Sugarloaf or Christ the Redeemer have indeed crossed the ages, and the means of representation of both visual and virtual communications.

Final Step on Visual Culture: Beyond (Post-)photography?

After all, perhaps the mega-events themselves, because of their monumentality, turn the city invisible. Are they blindfolding the view, as Marcos Chaves implied also, in his polysemic tongue-in-cheek caption “Eu só vendo a vista” (see Fig. 15.1)? There is an ideological discourse in such aesthetic process of performative visuality. Do photographic interventions produce an idealized visuality in the same fashion, or do they help to promote a visual consciousness? By definition, visual culture promotes a spectacular ephemerality of the image, besides the flows of its reproducibility, of its virality.

We are witnessing a transformation of the photographic experience itself. Beyond photography itself, it is perhaps urgent to return to the question of the gaze—now in a properly infinite visual culture. Let us start again, with the modes of appropriation of the look or gaze, as suggested precisely by Debray (1992). Depending on the emphasis (photography, the visual, the gaze, the screens...), the consequences are different. Projecting images on monuments and buildings may create photo/cinematographic aberrations. However, such projections may induce or rein-

force politicized forms of resistance and resignification; in which case they may be creating also forms of appropriation of the gaze that are yet unknown.

The ephemerality of the image is now guaranteed: any visual essay begins almost inevitably with a quick search in Google Images—the present chapter confirms the rule. Captured in the same, unique cyberspace, we may find both the Sugarloaf cable car of 1912 and just as many possible representations of cyberspace itself. Visual culture appears as an endlessly floating signifier; no definitive capture possible whatsoever. Any photograph, any new image “of synthesis” (Balandier, 1987) as they were called in the 1980s, have now the exact same exchange value—one of a permanent circulation through the networks. And yet increasingly, the ways of appropriation of the gaze are dictated by artificial intelligence and its complex algorithms.

Thus, it seems, digital photography is no longer one of alterity and representation, but rather one of a complete immersion in the flow of televised information and images, as pointed out by Debray (1992). More recently as we have seen, Lipovetsky and Serroy (2007) approached the Internet and its incessant feeds of data and images with the same premise: complete immersion once again. The media were the extensions of man (McLuhan, 1964); with the permanent digital circulation and the screens, an inversion took place: man has himself become an extension of the media, trapped in the integrated circuit of the “overcode” (Holmes, 2009). In the same way, we are immersed in and impregnated by, visual culture. Indeed, we have reached in this sense, a “post-photographic” moment (Rouillé, 2020), when digital photography is no longer photography, but rather a continuous flow of images circulating in the social networks. To the famous question “What do images want?” (Mitchell, 2005), we may desperately try to resist, and ask ourselves “What can we do *against* images?” Obviously, the answer is not simple.

We have to extend the “appropriation of the gaze” hypothesis—the one without which nothing is captured, and nothing is registered. At some point, an appropriation of the visual media

must take place. Some deviations, counter-uses, expropriations, re-appropriations must arise. Perhaps the photographic works of JR or Vik Muniz help us to think of the twenty-first century (post-)photography moment, more so than the works of, say, Yann Arthus-Bertrand. In order to survive in a post-representation world, verticality is not enough. Yet, some works of JR or Vik Muniz seem to be coming back to a certain—yet different—horizontality.

With JR, literally, we have an *inscription* of photography in the environment; an *appropriation* of the physical space by the photographic space; and also a *participation*, an involvement with the local populations. One of the most popular photographers today, JR dialogues with various projects involving people, faces, and figures—from the borders between Israel and Palestine or the United States and Mexico, to Rio’s Providence Hill. Let us remind that, prior to his 2016 intervention during the Olympics, JR had been involved in two projects with the Providence Hill favela in 2008, before the port area underwent its major renovation. While the installation “Women Are Heroes” featured gigantic photographic portraits of women from the community glued to the houses and staircases of the favela, the “Olhos” (“Eyes”) project did the same with gigantic eyes, the residents’ eyes looking over what was not yet at the time the “new” Praça Mauá.

Both JR’s and Vik Muniz’s photographic works make direct use of the cityscape as a stage for their interventions involving various people and communities, inventing new forms of participatory art where the usual horizontal coordinates are increasingly mixed with verticality and virtuality. Whether or not criticized for just parashooting in (he has), JR’s intervention practices suggest an eminently participatory conception of photography, beyond the somewhat outdated regime of traditional representation. Thus, JR suggests new ways of living and interacting with photography in the twenty-first century: appropriating the city’s landscapes, buildings, and monuments, staging urban space itself as the very *locus* for the real and virtual worlds today, for real and imagined visualities—still, always involving the peo-

ple, be they local communities, city dwellers, *flâneurs*, or tourists.

Meanwhile, Vik Muniz manages to transform photography *from within*—changing the very ingredients of what made photography possible in the first place, from chemical to organic. Hence, his use of coffee drips, cardboard, or plastic bottles. Vik Muniz plays with the very process of making photographic images—either when “producing” a unique and original photograph, or when “reproducing,” as we have seen, Augusto Malta’s classic 1910 vista of the Sugarloaf. Thus, staged once again, Rio’s “natural born monument” proves an enduring companion to the perpetual reinvention of visual representation in the virtual age.

Acknowledgments The author would like to extend his sincere gratitude to the authors and photographers who generously donated their images for reproduction in this article. These include Marcos Chaves (Fig. 15.1: “Eu só vendo a vista,” photo collaboration by Vicente de Mello) and Rosane Araujo (Fig. 15.5: “A cidade sou eu,” photography and photo montage by Rosane Araujo).

References

- Araujo, R. (2011). *A cidade sou eu*. Rio de Janeiro: Editora Novamente (English translation, 2013: *The city is me*). Bristol: Intellect Books.
- Balandier, G. (1987). Images, images, images. *Cahiers Internationaux de Sociologie*, 82, 7–22.
- Benjamin, W. (1969). The work of art in the age of mechanical reproduction (1935). In H. Arendt (Ed.), *Illuminations* (pp. 217–251). Schocken Books.
- Berdet, M. (2013). *Fantasmagories du capital. L’invention de la ville-marchandise*. La Découverte.
- Codrescu, A. (2001). *The disappearance of the outside. A manifesto for escape*. Ruminator Books (originally published 1990).
- Costa, L. (2009). *Acervo Lúcio Costa (Achados)*. Casa de Lúcio Costa.
- Debray, R. (1992). *Vie et mort de l’image. Une histoire du regard en Occident*. Gallimard.
- Harvey, D. (1989). *The condition of postmodernity: An enquiry into the origins of cultural change*.
- Herkenhoff, P. (Org.). (2013). *Rio de Imagens: Uma paisagem em construção*. Museu de Arte do Rio.
- Holmes, B. (2009). *Escape the overcode: Activist art in the control society*. What, How & For Whom.
- de La Barre, J. (2016a). A festive surveillance: Mega-events in Rio de Janeiro. *Streetnotes*, 25, 13–28.
- de La Barre, J. (2016b). Future shock: Mega-events in Rio de Janeiro. *Leisure Studies*, 35(3), 352–368.

- de La Barre, J. (2019a). On the contemporary visual experience. Part one: Vir(tu)al horizon(tal). *Streetnotes*, 26, 1–19.
- de La Barre, J. (2019b). On the contemporary visual experience. Part two: The vertical gaze. *Streetnotes*, 26, 132–147.
- de La Barre, J. (2019c). On the contemporary visual experience. Part three: Oblique strategies. *Streetnotes*, 26, 265–280.
- de La Barre, J. (2020). Selling the view. In L. Brites Pereira et al. (Eds. & Orgs.), *Economic globalization and governance* (pp. 190–195). Springer.
- Lipovetsky, G., & Serroy, J. (2007). *L'écran global. Du cinéma au smartphone*. Seuil.
- McLuhan, M. (1964). *Understanding media: The extensions of man*. McGraw-Hill.
- Mitchell, W. J. T. (2005). *What do pictures want? The lives and loves of images*. The University of Chicago Press.
- Ortiz, F. (2012, April 27). Rio recebe a exposição A Terra Vista do Céu, do fotógrafo e ativista francês Yann Arthus-Bertrand. *Tilt UOL*. Retrieved February 27, 2022, from <https://www.uol.com.br/tilt/ultimas-noticias/redacao/2012/04/27/a-terra-vista-do-ceu-expoe-fotos-aereas-para-sensibilizar-sobre-protacao-meio-ambiente.htm>
- Ribeiro, G. L. (2007). Cultural diversity as a global discourse. *Série Antropologia*, 412, 7–32.
- Ribeiro, R. W. (2016). *Rio de Janeiro: Paisagens entre a montanha e o mar*. Martins Fontes Paulista.
- Rolnik, R. (2012, July 2). Favelas cariocas entre a montanha e o mar são patrimônio da humanidade. *Blog da Raquel Rolnik*. Retrieved February 16, 2022, from <https://raquelrolnik.wordpress.com/2012/07/02/favelas-cariocas-entre-a-montanha-e-o-mar-sao-patrimonio-da-humanidade/>
- Rouillé, A. (2020). *La photo numérique. Une force néolibérale*. L'Échappée.
- Szerszynski, B., & Urry, J. (2006). Visuality, mobility and the cosmopolitan: Inhabiting the world from Afar. *The British Journal of Sociology*, 57(1), 113–131.
- Urry, J. (1990). *The tourist Gaze: Leisure and travel in contemporary societies*. Sage.
- Weelden, W. (2010), Escape the overcode: Activist art in the control society (review). *Open! Platform for art, culture and the public domain*. Retrieved January 9, 2023, from <https://onlineopen.org/escape-the-overcode-activist-art-in-the-control-society>
- Zukin, S. (1991). *Landscapes of power: From Detroit to Disneyworld*. University of California Press.
- Zukin, S. (1995). *The culture of cities*. Blackwell.
- Zukin, S. (2010). *Naked city: The death and life of authentic urban places*. Oxford University Press.



Elemental Monsters: Aeolian Politics and the Protests Against Renewable Energy in Tinos, Greece

Adam Fish

The wind is a force with erosive as well as constructive effects on life. It erodes stone and distributes plant seeds. Gusts pummel vegetation and light winds carry fertilizing soils. In sails, wind can be harnessed by humans as a source of locomotion across seas. Strong winds can also destroy human property and life. In the context of climate change, the wind's force has been celebrated for its ability to spin turbines and generate renewable energy. Technologies enable humans to experience the wind's force. Drones that exploit the lift provided by atmospheric gasses or turbines that twirl because of the movement of those gasses are technologies that provide an opportunity to capitalize on the wind's power. But this experience of wind power is not without its controversies. For those who live in their shadow on the small Greek island of Tinos, wind turbines are an aesthetic nuisance and environmental blight. They represent economic exploitation—the energy they produce is not for local consumption but for use in faraway urban centers. For these reasons beginning in 2019, they protested the ultimately successful construction of three wind turbines. The protestors accept the need to decarbonize electrical capacities, but they do not want their island to

be sacrificed in the process. While this perspective from Tinos appears as provincial, there remains much to learn from Tinos about coping with the global threat of climate change. Using aerial, terrestrial, and peripatetic video and found-sound methodologies the author constructed a video about the social responses to living with wind, dryness, and heat on Tinos. Like the Earth of the future, Tinos is dry and hot. Tinians have developed a number of technological and more-than-human relationships with the land and animals of this island that present a model for how to live in a warming world.

What follows is a transcript of an oral and video performance by the author at the conclusion of the multi-week Four-plus one Elements artist residency program organized by the cultural foundation Kinono and held on Tinos. With a small audience, the author spoke the script while his video Elemental Monsters was projected inside a cave on the deserted Livada Beach, Tinos (Fig. 16.1).¹

As many privileged travelers have done before, I came to Tinos, Greece, to investigate a myth. My myth was a story about a whale. In 1854, a rare sperm whale was seen by German

A. Fish (✉)
Faculty of Arts and Social Sciences, School of Arts
and the Media, University of New South Wales,
Sydney, NSW, Australia
e-mail: a.fish@unsw.edu.au

¹A heartfelt thank you to the excellent camaraderie and support shared amongst all participants and organizers of this artist residency, in no particular order: Eleni Zouvou, Marilena Katranidou, Steve Bates, Maro Fasouli, Jacob Moe, Paul Mouginot, Kleopatra Haritou, Christos Artemis, and Alexia Pappa.

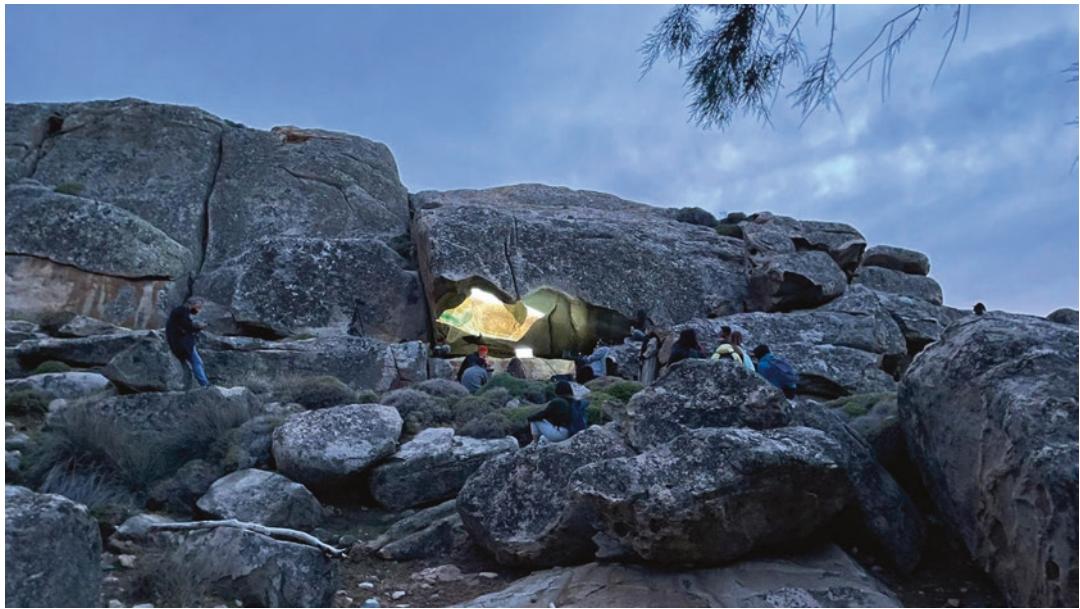


Fig. 16.1 Image from live site-specific performance of *Elemental Monsters* (Fish, 2022c)

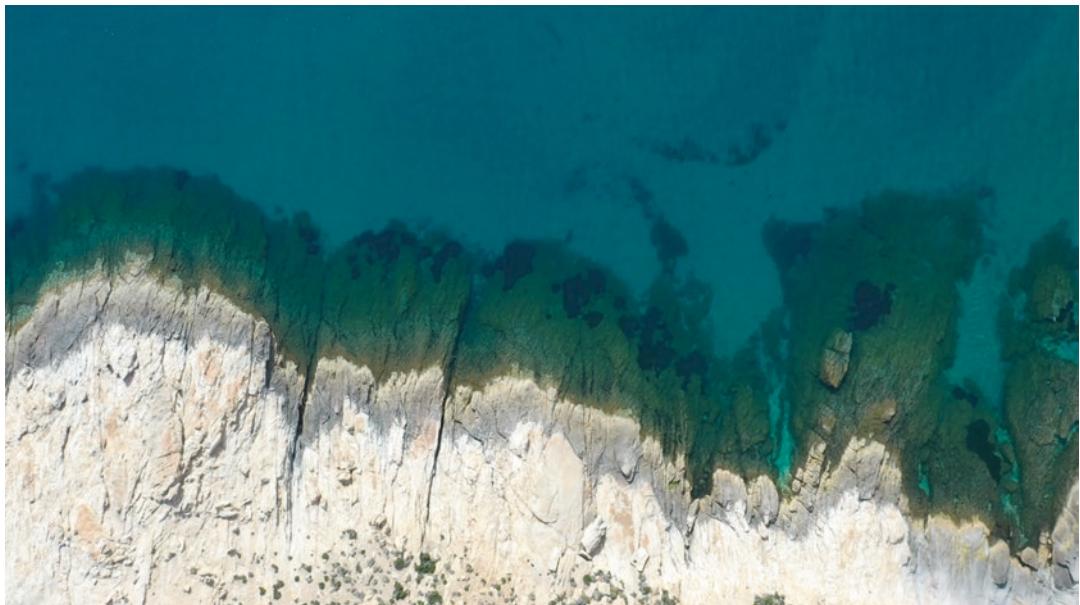


Fig. 16.2 Drone image from *Elemental Monsters* (Fish, 2022c)

naturalists, beached on Livada Beach on the northeast side of the island (Erhard, 1857 in Kinzelbach, 1986) (Fig. 16.2). Only 164 sperm whales are known to exist today in the eastern Mediterranean Sea (Berry, 2017). Wild animal

sightings on this island and increasingly throughout the world are rare—the endangered sea life, mammals, and plants of Greece are little documented and underprotected, Greece is after all one of the least biodiverse states in the



Fig. 16.3 Wind turbines in the background, from *Elemental Monsters* (Fish, 2022c)

European Union. For this reason, Tinos is the right place to look for forgotten or little-understood beasts.

I traipsed many of the island's paths, walking for over 20 hours and an equal number of kilometers and couldn't find many wild animals—and no whale sightings. Millennia of settlement and large-scale agriculture and domestication on a dry, rocky, wind-swept, and embattled island have stripped the island of what we can imagine was once a thriving site for migratory fish, sea mammals, arboreal birds, floating seeds, and lofted insects. So, while the wind and the sea have thus far failed to return wild animals to this island, rewilding it with migratory species, a few other monsters have arisen.

While bereft of diverse biological life, the island's winds have brought another monstrous nonhuman force and one little understood for its influence on life. The wind has long been an energy resource having carried to Tinos Phoenicians, Greek, Italian, and now North American and Asian sailors. The wind draws not only people but a new suite of suitors and a new gaggle of nonhumans.

Instead of stories of the sperm whale, the monster I discovered on the island, half myth/half real, is the wind turbine (Figs 16.3 and 16.7). Looming on mountain ridges, whirring a ghastly otherworldly hum, blinking to communicate with heavenly airplanes, pushing aside other organisms with its concrete footprint, harnessing and appearing to control the wind, coming from afar of an incomprehensible size, extracting a resource for export, the wind turbines are considered monsters for many in Tinos.

I experienced the disinterested nonhuman force of the wind while making this video artwork. Deploying the drone to document the ecological impact of the wind turbine, I floated above the wind turbines in a near gale force wind.² The images situated the turbines as aliens in a lunar landscape of wild thyme, white quartzite, and green marble. But these compelling images were

² Dronework requires participation with the “turbulences and volatilities of ubiquitous air” (Choy and Zee 2015: 217). In the process, it engages an “elemental politics” (Jue and Ruiz 2021) an existential politics that is contingent upon the wind’s interaction with the ocean (Howe and Boyer 2015).

not to be folded into that artwork nor this chapter. While piloting, a gust emerged from the north and shoved the drone down the south slope at an alarming speed.³ We watched the drone try to return to its human masters, the whirring magnets in its motors at full throttle. But the distance continued to increase, second by second, meter by meter, away from us and over the seaside village of Kardiani, before it crashed into a terrace of shale stone, tired sheep, and iron fencing.⁴ Hours of diligent walking through thistles, stinging nettle, sheep shit, and over rusted fences resulted in nothing but cuts, bruises, a snake sighting, and an answer to the question posed to me by a worried sheepherder, “what are you doing?” “I lost something,” I muttered, exhausted.

So as the wind pushed us about, ripped through every window, restructured the shape of trees, sculpted irregular boulders into balls and animal shapes I felt like I found something more sublime than a drone or a whale corpse—the agency of nonhumans like the wind, animals, landscapes, and energy megatechnologies. I asked myself: in this world in which humans appear to create their own climate, affect the temperature and cycles of the ocean current, modify wind patterns with their release of insulating greenhouse gases—in this world of air/culture wherein the wind’s savagery is rewilded with the externalities of industrial waste—how do the elements structure life? Here on Tinos the wind tells us. We may document the wind, and funnel it to a purpose, but it, like the other elements such as the sea, magma under the Earth, the gravitational roll of rocks, and the meandering of mountains, the wind is beyond our control (Fig. 16.4).

³Several media and communication scholars have written about the uniquely embodied acts of drone piloting and how it is an experience that reveals the entanglements of the elements, technologies, and that which the drone investigates (Fish 2022b; Fish et al. 2017; Hildebrand 2021; Jablonowski 2020; Serafinelli and Lauren O’Hagan 2022).

⁴Elements disrupt and cause death but also provide the conditions for movement and life (Braverman and Johnson 2020; Engelmann 2020; Fish 2021; Fish 2022a; Jue 2020; Jue and Ruiz 2021; McCormack 2018; Parraga 2015; Peters 2015; Starosielski 2016; Vehlken, Vagt, and Kittler 2021).

This is a question of what we call “elementality.” The elements flow, coagulate, stick, repel, attract, and attack.⁵ Elements disrupt—causing turbulence, crashes, sinking, death, or worse. But the same elemental forces that provide buoyancy for floating and flying carry the chemical building blocks for life. Elementality is as much about limitations as capacities. Elementality describes substances between, through which connections flow. The elements disrupt lift and movement, challenging us with gusts, swell, salt, sand, ice, and storms (Fig. 16.5). The elements constrain and also enable. They are thus a force that can be channeled. The wind is a nonhuman element that enables action. But for whom? On this island, the control over wind and the control of people are intertwined.

This is an ancient story. From pushing the sails of conquerors to this island, wind has always been an element of power on Tinos. Increasing the heat of the sea and the atmosphere through the addition of sheathing carbon dioxide makes this wind less predictable and more powerful. The earth of the future will be more windy, not less. The rest of the world is becoming more like Tinos—hot, dry, rocky, windy, with less drinking water—but can the world learn the lessons of resiliency which Tinians have innovated in this windswept world?

From trireme sails to windmills, winnowing wheat to drying clothes, from whipping up seas to sculpting canyons, the wind enables work. Like those in my drone the wind turns turbine magnets made of rare metals encased in steel and aluminum. The wind on island peripheries like Tinos generates electrical charges that travel copper wires underwater to energize urban centers in Athens and beyond. This electrical power is real power for offsite energy capitalists, elites, investors, and their compliant politicians.

⁵Elemental thinking has captured the imagination of scholars of science, technology, media, geography, and anthropology but its origins are ancient dating to classical antiquity and beyond (Macauley 2010; Papadopoulos, Puig de la Bellacasa, Myers 2022; Peters & Steinberg 2019).



Fig. 16.4 Paul Mouginot known as the artist aurèce vettier collecting wind in Tinos. Scene from *Elemental Monsters* (Fish, 2022c)



Fig. 16.5 Underwater scene from *Elemental Monsters* (Fish, 2022c)

Wind waves ripple over us, kicking and encouraging the eruption of local gases. Wind is constant in Tinos, but constantly passing carrying the scents of wild thyme, honeysuckle, fresh fish,

rotting snakes, and dead goats. In life and death, Tinian humans and animals live with wind and feel its significance in their daily lives and afterlives.



Fig. 16.6 Talos as depicted in *Jason and the Argonauts* (1963) and seen in *Elemental Monsters* (Fish, 2022c)

There is a dominant power but also counter-power in this local knowledge of wind. In the slip-stream of wind is a resistant force, in wind there is a possibility to counter domination. Harnessing wind power by off-island businesses by imposing turbine monsters has reawakened the awareness of the wind as a force for solidarity.

No other concern has galvanized the people of Tinos as the threat of additional wind turbines. On an island of 8000, 1500 came to situate their bodies to blockade the transportation of turbine blades on a darkened barge amidst the COVID-19 quarantine. Nine or so were arrested. Several were beaten by police; a show of force never before seen on this island. I spoke with several of the protestors. Many of the activists are not against renewable energy. They recognize the correlation between carbon emission and climate change. They see that replacing hydrocarbon fuel with wind and solar sources for the production of energy is one important act in decarbonizing energy supplies. What they want is to enjoy the benefits of renewable energy, be party to the decision-making, not be exploited, and have ecological, aesthetic, and sonic justice for their

island and the nonhumans that therein dwell. The activists are prepared to continue to leverage the power of wind for their goals of local empowerment.

The Tinian activists may think that the wind turbines are a kind of modern manifestations of Talos, a giant bronze robot created by Hephestos to protect Europa on the island of Crete (Fig. 16.6). Talos is a kind of energy demigod, called Solar Zeus, in the Cretan dialect. Sometimes he is winged and thus a being of the atmosphere. His sword appears almost like a whirling propeller. He promises local protection and the protection of riches but at a cost to freedom. In the classic stop-animation film *Jason and the Argonauts* (1963), upon hearing the metal of Talos' body creak Hercules mutters, “it must have been the wind.” Rotating around the island three times a day, if it saw an invasion Talos would hurl boulders at the invading ships. He was fueled by ichor, a kind of cosmic electricity. For other enemies he would embrace them, energizing his ichor or solar power and burn them to a crisp. The witch Medea killed Talos by hypnotizing him with drugs and unplugging the vein through which his ichor flows. Channeling the

sun—the motions of the wind are the result of solar heating—and standing atop and supposedly protecting the Greek islands, the wind turbines are a modern-day manifestation of Talos.

The paradox is that the climate crisis is not only a crisis for Tinos but a global problem. Wind does not stop at the border, nor do heat, hurricanes, rising seas, and climate refugees. Stopping renewable energy here will add more carbon into the atmosphere, increase the planet's heat, and exacerbate the social, economic, and environmental consequences of global warming. Trillions of dollars lost, an extinction crisis, a migratory exodus of millions of people, and possibly the erosion of the fragile fundamentals of modern civilization which began for many of us in Greece 2500 years ago—the rule of law, democratic institutions, and rationality—are threatened if planetary heating does not slow and stop (Fig. 16.7).

But from the perspective of the Tinian activists, the winds should continue to swirl through the olive and lemon trees, distributing their pollen as they have for millennia, but it has no responsibility to turn out electricity for the Grecian mainland. This conservative vision

shared with me by the anti-wind energy activists is not opposed to historical change as long as it is slow, respects cultural traditions, is inclusive of local concerns, empowers domestic citizens, honors ecologies, and preserves the aesthetic of the island. They don't want change forced on them for the profit of others. Climate threats outside are not threats inside Tinos, or so they hope. I hope they are right (Fig. 16.8).

There is something to learn from the conservative character of Tinian culture that can inform and inspire the world. They are resilient people that show how to live in a world ravished by climate change. The Tinians have modified this island in relationship to heat, wind, dryness, and close contact for millennia. The island is stripped of indigenous flora and yet ringed with xerolithia, ingenious terraces for retaining water (Fig. 16.9). Dovecotes attract the domesticity and breeding of rock pigeons. Tinians collect their nitrogen and phosphorus-rich guana to reinforce the soils in these terraces, stripped of their nutrients by wind. Windmills ground grain for export throughout the Sea. Churches stabilized the land in medieval traditions. Tinians have practiced panigyri, summer festivals of singing, dancing, drinking, eat-



Fig. 16.7 Wind turbine, scene from *Elemental Monsters* (Fish, 2022c)



Fig. 16.8 Panigyri, or traditional summer festival, in *Elemental Monsters* (Fish, 2022c)



Fig. 16.9 Xerolithia, or stone terraces, in *Elemental Monsters* (Fish, 2022c)

ing, and carousing for centuries (Fig. 16.8). These slow arts of cultural continuity on a dry, hot, windy, and intimate island offer paths of resilience to the rest of the world. The protests

against the wind turbines are themselves integral aspects of communal, democratic, island living wherein local people contribute to decisions of a global nature.

And that is what I learned in my brief stay. But what do I know? I am only a visitor carried on the lift provided to carbon burning airplanes to and tomorrow off this island. My people have little culture, having left it for America and then Australia. But beyond wind and protest, Tinos shows the world how to subsist on a dry rocky world, with rising seas lapping at shores, and to do so with your culture intact.

The opposition to wind turbines on this island tests democracy, the equal distribution of political power across the polis. For modeling how to live in a hot world, live with nonhuman monsters, and exercise the right to voice and protest, Tinos has much to teach the world about how the elements of wind and sea, stone and waves, social power and energy come together. Attention to nonhumans—the elements of wind and waves, whales, dead goats, splattered snakes, crashed drones, wind turbines, and the light refracted through the Sea—brings us to the source of human and more-than-human power.

References

- Berry, G. (2017). New estimate for Mediterranean sperm whale population, [whales.org](https://au.whales.org/2017/05/24/new-estimate-for-mediterranean-sperm-whale-population/). <https://au.whales.org/2017/05/24/new-estimate-for-mediterranean-sperm-whale-population/>
- Braverman, I., & Johnson, E. R. (2020). *Blue legalities: The life and Laws of the Seaeditors*. Duke University Press.
- Choy, T., & Ze, J. (2015). Condition—Suspension. *Cultural Anthropology*, 30, 210–223.
- Engelmann, S. (2020). *Sensing art in the atmosphere: Elemental lures and aerosolar practices*. Routledge.
- Erhard, N. (1857). Notizen, briefliche Mitteilungen. *Naumannia*, 7, 87–89, Stuttgart.
- Fish, A. (2021). Crash theory: Entrapments of conservation drones and endangered megafauna. *Science, Technology, & Human Values*, 46(2), 425–451. <https://doi.org/10.1177/0162243920920356>
- Fish, A. (2022a). Blue governmentalities: Elemental activism with conservation technologies on plundered seas. *Political Geography*, 93, 102528.
- Fish, A. (2022b). Degenerate ecocinema: Indexing entropy with drones. *Visual Studies*, 37(3), 194–204.
- Fish, A. (2022c). *Elemental monsters, live performance*, Livada Beach, Tinos, Greece.
- Fish, A., Garrett, B., & Case, O. (2018). Drones caught in the net. *Imaginations: Journal of Cross-Cultural Image Studies*, 8(2), 74–79.
- Hildebrand, J. (2021). *Aerial play: Drone medium, mobility, communication, and culture*. Palgrave Macmillan.
- Howe, C., & Boyer, D. (2015). Aeolian politics. *Distinktion: Journal of Social Theory*, 16(1), 31–48.
- Jablonowski, M. (2020). Beyond drone vision: The embodied telepresence of first-person-view drone flight. *The Senses and Society*, 15(3), 344–358. <https://doi.org/10.1080/17458927.2020.1814571>
- Jason and the Argonauts. (1963). *Columbia Pictures*. Don Chaffey director.
- Jue, M. (2020). *Wild blue media: Thinking through seawater*. Duke University Press.
- Jue, M., & Ruiz, R. (Eds.). (2021). *Saturation: An elemental politics*. Duke University Press.
- Kinzelbach, R. (1986). The sperm whale, Physeter macrocephalus, in the Eastern Mediterranean Sea. *Zoology in the Middle East*, 1(1), 15–17. <https://doi.org/10.1080/09397140.1986.11770900>
- Macauley, D. (2010). *Elemental philosophy: Earth, air, fire, and water as environmental ideas*. Albany, NY: SUNY Press.
- McCormack, D. P. (2016). Elemental infrastructures for atmospheric media: On stratospheric variations, value and the commons. *Environment and Planning D: Society and Space*, 0(0), 1–20.
- Papadopoulos, D., Puig de la Bellacasa, M., & Myers, N. (2022). *Reactivating elements: Chemistry, ecology, practice*. Duke University Press.
- Parikka, J. (2015). Earth forces: Contemporary land arts, technology and new materialist aesthetics. *Cultural Studies Review*, 21(2), 47–75.
- Peters, J. D. (2015). *The marvelous clouds: Toward a philosophy of elemental media*. University of Chicago Press.
- Peters, K., & Steinberg, P. (2019). The ocean in excess: Towards a more-than-wet ontology. *Dialogues in Human Geography*, 9(3), 293–307.
- Serafinelli, E., & O'Hagan, L. A. (2022). Drone views: A multimodal ethnographic perspective. *Visual Communication*. <https://doi.org/10.1177/14703572211065093>
- Starosielski, N. (2016). Thermocultures of geological media. *Cultural Politics*, 12, 293–309.



Revitalization and Touristification: The Vertical Cultural Landscape of Dacha Community in Siberia

17

Artem Yakovlev and Dennis Zuev

Introduction

The objective of this visual chapter is to reflect visually and socio-historically on the process of transformation and eventual revitalization of dacha community in a large Siberian city of Krasnoyarsk. *Dacha* is a Russian term for a relatively small plot of land, often with a seasonal allotment house (cabin), mostly used for growing vegetables, fruit, and berries. A dacha (as a group of buildings and a single building) is a unique type of built environment, ubiquitous across post-Soviet Russia and former Soviet Union states (Pungas, 2019), the dacha-houses that have over a 100-year history become an important part of Russian culture (Caldwell, 2010; Lovell, 2016). Often dachas are associated with the Russian art and literary circles as well as the privileged and elite echelons of society (Lovell, 2016).

In the Soviet era permitted size of the house changed over time from several square meters to multi-floor edifices. The locations where dachas were built also varied from suburban areas to areas far from the city. In the Soviet time dacha was an essential part of rural-urban assemblage

and mobility for many Soviet families (Zuev & Habeck, 2019) and its value and function have changed over the years from autonomous food-provision to being a second home primarily used for leisure and housing. What makes many dacha communities in Siberia special is the fact that they usually occupy high ground or are built on the slopes. While in the Soviet times flat areas and agricultural lands were occupied by collective farms (*kolhoz*), the sloped and densely forested landscape of the taiga forest along the Trans-Siberian railway near the large post-industrial city of Krasnoyarsk were allotted to the families for cultivation. Often located far from the city, the dacha owners traveled long distances via suburban train networks (*elektrichka*) (Zuev & Habeck, 2019). In addition to long journeys via public transport, most dachas also required a considerable amount of work in order to maintain the house and plot located on the slope. Working the space, was, as Pungas (2019) argues, part of the cultivating moral superiority of the working class (dacha owners) connected to the roots via land cultivation. One could add that this element of resilience cultivation was also enforced in the case of hard work on vertical slopes and grueling access to the land plot on top of the hill with little or no access to amenities (such as water or electricity).

Dacha is often seen as a by-product of urbanization, however in the Soviet time the out-of-town settlements—dacha collectives were

A. Yakovlev
Project Polden, Krasnoyarsk, Russia

D. Zuev (✉)
CIES-ISCTE, Lisbon, Portugal
University of Saint Joseph, Macau, China

established for the working-class *dachniki* (dacha folk) to have an experience with land cultivation and reconnect to nature. Dacha is an example of ideologically contested history; dachas can be found in countries that are actively erasing the tangible reminders of Soviet heritage, such as Latvia, Lithuania, and Estonia, especially triggered by the ongoing war between Russia and Ukraine. In the late Soviet period (1980–1990s) people were organized in dacha communities or cooperatives, that managed the gardens and often contributed to maintenance of infrastructure (water, electricity, roads) that had to deal with the hard terrain and height. Thus, in the 1960s through 1990s there was a considerable growth of “do it yourself” houses with remarkable bricolage techniques that reflected the ingenuity of the owners to make do with scarcity of construction material.

In Russian culture (Caldwell, 2010), dacha has rarely been investigated in relation to its vernacular heritage, the history of dacha in Russia is also much about history of living in nature. Despite being a crucial feature of vernacular heritage of the Soviet and post-Soviet periods, the dwellings and their features have been overlooked as built environment worthy of preservation and memorialization—to some extent similar to the *garage* (see Tuvikene, 2010). Only recently, have authors sought to address this as an issue of autonomous and “semi-professional” architecture (Shestopalov, 2010; Treivish, 2014).

In this chapter based on the case of Polden-park project we will examine a dacha community turned into a tourist attraction and will emphasize that for a large part of the dacha community in the city of Krasnoyarsk, it meant coping with the vertical topography, thus cultivating resilience and adapting the buildings to the vertical environment (see Fig. 17.1).

Further using the example of a dacha-community-turned touristic object—the project *Polden-park* we will demonstrate the local urban initiative to reassess the value of vernacular heritage capitalizing on its unique scenic topography on the slopes of the Sayan mountains. Due to ongoing urban sprawl of the Russian cities, dacha

communities in the suburban areas are endangered—they are diminishing, being replaced by typical housing blocks or falling apart and abandoned as the younger generation is reluctant to upkeep the urban gardening practices. The visual chapter thus builds on the ongoing project *Polden-park* as well as longitudinal ethnographic observations of evolution of a particular dacha community in Siberia.

The *Polden-park* project in the outskirts of Krasnoyarsk had an objective to promote the unique cultural landscape and part of material culture, a Russian “dacha village.” The project was an experiment in putting the dacha community as a unique city space on the geographic map (through practices of street-naming), at the same time, as a type of architectural open-air museum. The project aimed at transforming the place through creation of interpretation boards, information stands, scenic viewpoints (observation platforms), and tourist trails (staircases). Dacha buildings themselves are the key showpieces of the exposition. With little previous appreciation of them as valid architectural or built environment objects, the project provides a unique case of the tourist experience of the vernacular and thus backstage dimension of the Russian urban culture.

The project’s eventual aim is to reverse the perception of the exurban dacha community as a stigmatized, zone of risk and unorganized housing space, instead attracting attention of the authorities and wider public to the problems of the community by capitalizing on the conjunction of its vertical picturesqueness as well as unique material culture of buildings and gardening. The process of such marginalized spaces turned (tourist) places can be found in literature on informal housing that eventually had been touristified as was the case in Lisbon (see Jorge & Carolino, 2019), or in Rio de Janeiro (Name et al. this book), but fairly little has been written on this process in the context of post-Communist space. At the same time, one must note, that dacha communities are legal settlements, albeit the right to use them as formal housing (and thus a subject to an address) has been granted only since 2006 (the “dacha amnesty” law).



Fig. 17.1 Dacha terrain. Dacha Collectives on a slope. Ground view and aerial view. Dacha -community located outside and eastward of Krasnoyarsk, along the Trans-Siberian railroad, station (Pravaya). (a) *The left imageside of the image: A dacha community near Krasnoyarsk. Small land plots are dominated by a small wooden cabin located on a steep slope terrain (kosogor).* (b) *The right side of the image: Zdorovye-Krasfarma dacha community. Dense construction on relatively flat area, commanding access to nearby viewing points over the Stolby Nature reserve.* (Drone photo: Authors)

Dacha as Vernacular Heritage

Krasnoyarsk is one of the biggest urban centers in Siberia with the population of about 1.1 million residents, and the city has been rapidly sprawling and densifying in the last decade. The sprawl of the city has been facilitated by the increased automobility of the population and the growth of the residential housing districts. The multiple urban gardening communities that surround the city are often razed to make space for low-rise luxury villa communities or high-rise housing projects. However, some gardening communities are spared primarily as either they occupy land plots that are difficult for housing projects (slopes) or if they have high-voltage electricity communications passing nearby.

Dacha communities (“dachny massiv”) occupy a significant part of the urban territory. Specifically, the large community Zdorovye-Krasfarma established for the workers of the pharmaceutical factory in the 1960s is indeed one of the biggest neighborhoods in Krasnoyarsk, occupying the area of 5 sq. km. and with over 4500 people. Dachas occupy about 10% of the megapolis.

Due to the location in hilly mountainous areas the communities face several issues. Firstly, it is

the territory that remains outside of the attention of the authorities—as these lands are not suitable for residential condominium constructions and servicing these areas is costly. Thus, the majority of the “vertical” neighborhoods have problems with basic residential infrastructure—electricity, water supply, and transport accessibility. Consequently, new problems arise—reduced accessibility for the emergency services and an increase in crime activities—such as robberies, or drug storage (*zakladky*). Finally, dachny massiv becomes a marginal territory, without any prospects for development, a degraded urban zone, which has negative impacts on neighboring residential areas. Problems of dacha communities in Krasnoyarsk are characteristic of the many big cities in Siberia and Russia on the whole. Thus, dacha community within the city could be seen as a Siberian analogue of favela—a marginal (stigmatized), largely self-governed, and subject to DIY construction. The clear strategy for developing these urban and suburban areas is still absent. And as mentioned in Name et al. (this book)—dachas are part of the autonomous DIY movement regarding the built environment, that subsequently becomes touristified due to pictur-esque ness of the vertical topography.

Touristifying and Normalizing Dacha: Polden-Park Project

As an example of volunteer initiative to turn a dacha community into a more upgraded habitat is the project Polden-park (“Midday” Park), that is being developed since 2018 on the basis of the Zdorovye-Krasfarma. The community has a unique position as it is adjacent to scenic viewpoints over the city and the river on one side and wilderness of the Stolby Nature reserve on the other side (see Fig. 17.2). Polden-park project was launched to turn a dacha community into an open-air museum of dacha cultural landscape. One of the key objectives was to reinvent the idea of dacha aesthetically—to deviate from the idea of mundane dwelling serving urban gardening and to re-discover the aesthetics of vernacular dwelling and to create an exemplary low-rise garden neighborhood. The aesthetics of the vernacular dwelling is specific as it is located on top of the ridge and overlooks the famous nature reserve and the city of Krasnoyarsk. But it also has undesirable features for many urban residents—proximity to the city and “dodgy” areas of the industrial East Bank of the river, verticality (inconvenient for gardening), and existing high-

voltage electricity masts. The territory of this dacha community is commonly used for diverse sports events (orienteering, cross-country runs), and it is also a starting point for popular hiking trips.

The project over the years contributed to transformation of the neighborhood by means of street-naming, thus mapping the neighborhood and facilitating navigation for the everyday needs (delivery, ambulance, etc.), creation of informative stands describing the history and the value of particular dwellings or elements of urban gardening, and finally it re-created and touristified.

The project involved two major transformations. First was directed at improving the existing infrastructure. In particular, improving the transport accessibility of the territory—the principal road had been repaired, and the system of street navigation had been created. This facilitated in its turn access of the transport and emergency services to the community. The second transformation was directed at changing the perception of dacha as a unique cultural landscape. Invited experts helped to choose examples of DIY dacha architecture. These ranged from ascetic Soviet edifices of the 1970s–1980s to more modern constructions—regardless of the time of construction



Fig. 17.2 The dacha community with the wild nature in the back. Screenshot from a drone video. (Authors)

“exurban” dacha building presupposed “release from the strict standards of urban decorum” or style (Lovell, 2002, 77).

Thus, the buildings combine different styles, using the materials that were available, reconsidering the world architectural experience but at the same time considering the terrain and the nature of the snowy Russian winter. Polden-park included an example which was a replica of a nobility mansion of the nineteenth century, dalmatian medieval castle and even homage to the American architect Frank Lloyd Wright’s “Prairie Style”—all being made with local interpretations (see Fig. 17.3 for some of the examples). Each of these examples had a dedicated information stand for the visitors, who could also find more information online about each building. Finally, the park was eventually included into the network of tourist routes in the city of Krasnoyarsk.

Naming the streets was another instrument for changing the public perception of the dacha collective, with most of the names given by the

dacha residents themselves. The names were based on topographic features, reflecting the names of the rocks, ridges, peaks, and forests. Finally, due attention was paid to the specific places for appreciation of the vertical topology by the tourists—such as viewing platforms. While the natural observation points have always been appreciated by hikers and local residents, the project led to the disciplining of the aerial tourist gaze through highlighting them as part of the vertical cultural landscape and creation of safety railing, informational boards and maps with local and natural sights, as well as extra lighting, places for rest (benches) and improvement of footpaths.

In this sense, unlike tourism gentrification in urban centers touristification of exurban dacha community can be seen as a positive process of not allowing the neighborhood to fall in disrepair, raising awareness of the residents and city authorities and destigmatizing the area as a neighborhood of makeshift dwellings. Indeed,



Fig. 17.3 Individual houses. The figure combines several examples of dacha-houses. Individual architectural styles and use of materials, as well as garden planning

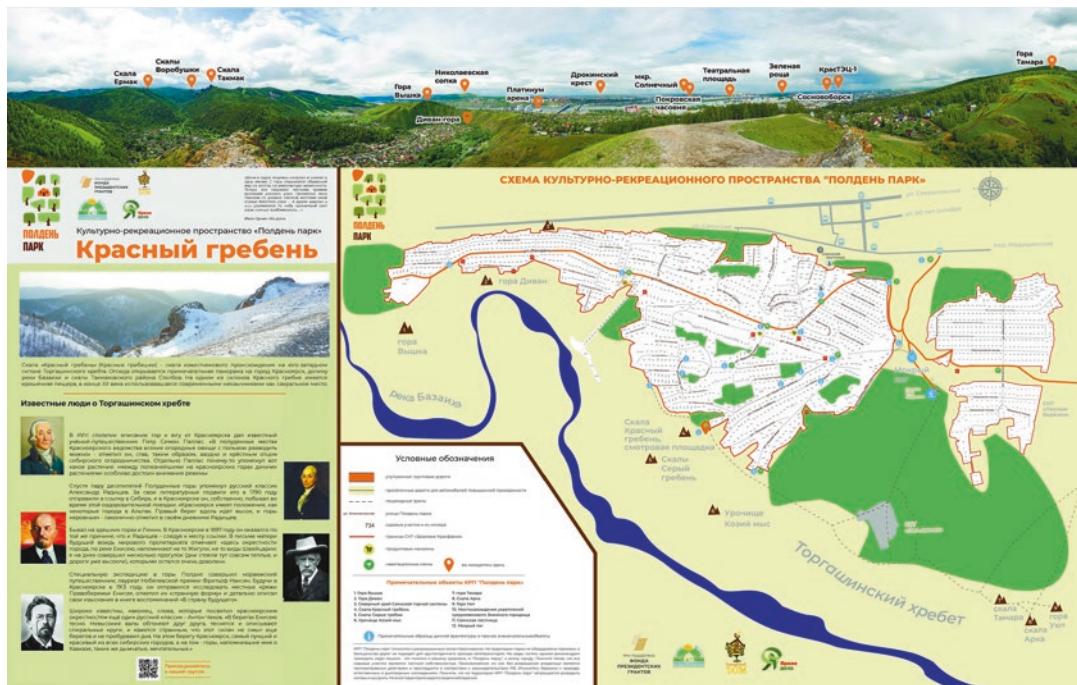


Fig. 17.4 Signage and information about the park. (Authors)

here the makeshift individualized architecture is branded as the legacy of the Soviet time and the peculiarity worthy of preservation, when the scarcity of materials meant that houses while often following common designs, used and recycled different materials in different combinations (see Figs. 17.3 and 17.4).

Disciplining Verticality

In this section we will deconstruct the staircase as an essential element of vertical infrastructure. According to S. Graham (see this book), there is still relatively little attention paid to the vernacular objects of vertical mobility such as elevators and staircases. In the case of Polden-park project an existing staircase serving the community to access the houses was turned into an art installation emphasizing the historical memories of the city and becoming an intriguing case for urban activism. Reconstruction of the existing staircase was an important added value of the

project as it facilitated safer access by community members and tourists to the area of the dacha community.

As many of the dacha communities are located on slopes or on tops of the hills, dacha residents often have to make staircases themselves, cutting/digging the steps into the slopes, enforcing them with available materials, adding the rails and maintaining them over the seasonal shifts. In the case of Krasfarma community, the Sayan staircase was built of steel and at the time was one of the longest staircases in the Soviet Union.¹ As with many infrastructural objects in that period the staircase fell in disrepair, and the dacha-community activists applied for a grant from the local authorities to turn the staircase—a vernacular piece of infrastructure into a recreational space and thus facilitating tourist access to the ridge adjacent to it. Simultaneously, the staircase was also turned into a tourist and municipal history

¹https://dzen.ru/a/YulflZXUmxuy8Lea?utm_1referer=yandex.ru

object with each step being dedicated to a specific event in the 400-year history of the city.

Interestingly, parallel to this initiative the local government also created another staircase at another point of the same ridge, which was hailed as the longest one in Russia and became an iconic tourist drawcard and Instagram hit in Krasnoyarsk. The latter project was however ambiguously received by the residents, especially the elderly, who questioned the necessity of a staircase in the mountains and its accessibility by the elderly in contrast suggesting that an aerial chairlift could have been a much better idea. Criticism was also based on the fact that easier access to the peri-urban wilderness spots in Krasnoyarsk meant increase in solid waste pollution in the mountains resulting from uncivilized tourists and picnickers and adding to the congestion of a narrow valley road leading to the entrance of the staircase.

The double staircase example is paradoxical, as one existing staircase improved access to the dachas and panoramic spots, and thus continued

to serve its functional purpose, the second staircase was a purely touristic object, albeit allowing the traverse of the difficult and steep terrain of the ridge for hikers.

The staircase (see Fig. 17.5) is thus a symbolic interface between the urbanity of the industrial city and the heights of the rural area. Which often means literal escape from the smog at the lower level and noise of the city fenced off by the green forest.

Summary

The case of Polden-park project suggests how vernacular heritage, specifically connected with the local culture and topography, can be reimagined and memorialized. Verticality can be a curse for the elderly residents with poor access infrastructure and can contribute to stigmatized perception of the space on the margins, but can be turned into a resource that can be effectively



Fig. 17.5 Staircase as an interface between the industrial urbanity below and the rurality and nature in the heights

tapped facilitating touristification of the area. In the case of this particular dacha community, infrastructure (such as staircase) along with street-naming were positively perceived by the residents. While information and navigation boards facilitated raising awareness of different landmark dwellings among residents and visitors. On the downside, infrastructure increased the foot flow of hikers, impacting the rural quietness of the area—the essence of the rural escape to dacha. However, as this is the case of revitalization of a suburban space, where people do not reside on a permanent basis, one could argue that impacts are nowhere near those experienced by the residents in the European city centers (Sequera & Nofre, 2020).

In this visual chapter we reflected on the contemporary processes relating to suburbanization of Russian cities, and specific type of rural revitalization (“tourism gentrification” (Sequera & Nofre, 2020)) related to expanding dacha communities and the touristification of the verticality as a sightseeing resource. A further direction could be in-depth conceptualization of vertical or aerial tourists seeking new experiences not purely related to the gaze but also other senses, such as vertigo or excitement (see Deriu, this book) or the experience of commanding the elements (such as wind) which can be found among drone-tourists (Zuev & Bratchford, 2020). The chapter also contributes to understanding of urban activism as an important social force in continuous reimagination of the dwelling in and with the nature as a constitutive part of Russian culture.

Acknowledgment We would like to acknowledge the footage provided by the drone pilot-photographer, Petr Panchenko, who braved subzero temperatures when doing the videos in January 2020.

References

- Caldwell, M. L. (2010). *Dacha Idylls: Living organically in the Russian countryside*. University of California Press..
- Jorge, S., & Carolino, J. (2019). Um lugar em produção: o caso da Cova da Moura. *Forum Sociológico* [Online], 34 | 2019. Retrieved January 28, 2023, from <http://journals.openedition.org/sociologico/4980>; <https://doi.org/10.4000/sociologico.4980>
- Lovell, S. (2002). Between Arcadia and Suburbia: Dachas in late Imperial Russia. *Slavic Review*, 61(1), 66–87.
- Lovell, S. (2016). *Summerfolk: A history of the Dacha, 1710–2000*. Cornell University Press.
- Pungas, L. (2019). Food self-provisioning as an answer to the metabolic rift: The case of ‘Dacha Resilience’. *Journal of Rural Studies*, 68, 75–86.
- Sequera, J., & Nofre, J. (2020). Touristification, transnational gentrification and urban change in Lisbon: The neighbourhood of Alfama. *Urban Studies*, 57(15), 3169–3189.
- Shestopalov, S. S. (2010). Дачная застройка второй половины XX века как явление полупрофессиональной архитектуры. *Architecture and Modern Information Technologies*, 3(12), 12.
- Treivish, A. I. (2014). ‘Dacha Studies’ as the science on second homes in the West and Russia. *Urban Rural Geographer*, 4, 179–188.
- Tuvikene, T. (2010). From Soviet to post-Soviet with transformation of the fragmented urban landscape: The case of garage areas in Estonia. *Landscape Research*, 35(5), 509–528.
- Zuev, D., & Bratchford, G. (2020). *Visual sociology: Politics and practices in contested spaces*. Palgrave.
- Zuev, D., & Habeck, J. O. (2019). Implications of infrastructure and technological change for the lifestyles in Siberia. In J. O. Habeck (Ed.), *Lifestyle in Siberia and the Russian North* (pp. 35–104). OpenBook Publishers.

Index

A

- Acrobatic flight, 26, 35
Adey, Peter, 2, 75, 85, 87–89, 93, 125, 129–131, 133
Aerial, 3, 7–14
 cable ways, 3, 7–14, 58
 scenes, 161
Aesthetic, 1, 8, 41, 49–51, 73, 118, 146, 173–175, 191, 195, 200, 201, 208
Algorithms, 12, 48, 51, 109, 111, 112, 114, 115, 119, 191
Amateur, 10, 19–22, 104, 165
Architecture, 6, 7, 13, 69, 70, 76, 137, 138, 141, 143, 150, 155, 157, 159–161, 168, 174–176, 190, 206, 208, 210
Art, 1, 3, 10, 11, 19, 25–27, 50–52, 64, 70, 106, 111, 116, 119, 137, 138, 141, 143, 180, 183, 186–189, 205, 210
Asia, 55, 61, 106, 155
Astronaut, 2, 10, 25–27, 29, 33, 34, 37
Atmosphere, 1–4, 9–11, 21, 28, 55, 60–62, 75, 76, 81, 90, 148, 161, 198, 200, 201

B

- Bratchford, Gary, 1–3, 5, 11, 14, 55, 63, 69, 87, 88, 93, 171, 176, 212
Brazil, 13, 55, 169, 171, 174, 180, 182–186
Brazilian, 13, 168, 169, 171, 173, 176, 179, 185

C

- Cable car, 8, 9, 13, 58, 181, 182, 184, 188, 191
China, 47, 58, 60, 73, 115
City, 4, 7–14, 21, 39, 40, 44, 45, 47, 48, 55–64, 69–72, 76, 77, 81, 125, 129, 133, 137, 138, 143, 145, 150–157, 159, 160, 165, 168, 169, 171, 173–176, 179, 182–187, 189–192, 205–212
Climate, 8, 10, 13, 60, 63, 65, 71, 72, 75–77, 79–81, 110, 195, 198, 200, 201
Clouds, 3, 52, 72, 150
Cold War, 11, 99, 102

Colonisation, colonial, 12, 88, 105, 111, 112, 115, 116, 119, 120

Computer Generated Image (CGI), 13, 155, 158

COVID-19, 3, 4, 21, 47, 143, 191, 200

Cultural landscape, *see* Landscape

Cyanotype, 13, 104, 105, 155, 158, 160, 161

D

- Dacha
 architecture, 208
 community, 14, 205–212
Dance, 10, 25–29, 33, 34, 36, 165
Data, 12, 22, 26, 30, 41, 42, 45–48, 50–52, 71–74, 76–79, 81, 86, 89, 92, 113–115, 117, 118, 120, 191
Decolonial, 173, 174
Dive, 31, 50, 79
DIY, 10, 19–22, 207, 208
Drone, 2, 5–7, 11–14, 43, 55, 58–60, 64, 69–81, 85–94, 109, 111, 112, 115, 118, 121, 125–128, 195–198, 203, 208
Droneviewing, 3–7
Dubai, UAE, 4, 13, 60, 61, 63, 64, 155–157, 159, 160

E

- Earth, 10, 13, 14, 22, 25, 27–37, 47, 63, 64, 77, 79, 80, 87, 92, 102, 104, 146, 184, 195, 198
Ecological impacts, 13, 63, 197
Elements, 6, 7, 12–14, 69, 72, 80, 100, 115, 125–127, 129, 150, 168, 174, 176, 195, 198, 203, 205, 208, 210, 212
Elevation, 2, 8, 12, 69, 143
Elevator, 13, 56, 58, 141, 210
Emotion, 5, 26, 34, 138
Environmental, 1–4, 6, 22, 61–64, 70–72, 77, 81, 86, 109–111, 143, 174, 195, 201
Ethnography, 13
e-VTOL, 57, 60, 64

F

- Falling, 3, 9, 10, 12, 30, 34–36, 137–139, 143, 146, 206
 Favela, 13, 58, 166–176, 182, 188, 192, 207
 Feminism, 10, 21, 22
 Film, 26, 48, 59, 73, 80, 111, 138–143, 165, 184, 200
 Flight, 10, 25–30, 32–35, 64, 72, 75, 86, 87, 90, 132
 Flying, 6, 12, 28, 30, 60, 64, 76, 133, 145, 198
 Future (futuristic), 3, 4, 11, 12, 55, 60, 63, 64, 69, 71–73,
 75–81, 106, 109–121, 133, 150, 155–158, 174,
 175, 195, 198

G

- Gaze, 3, 5, 6, 8, 9, 12, 22, 39–52, 57–59, 87, 111, 116,
 117, 120, 121, 125–128, 138, 141, 188, 189,
 191, 209, 212
 Geography, 11, 12, 58, 59, 64, 79, 80, 90, 91, 102, 115,
 116, 119, 166, 168, 190
 Google, 106, 115, 188
 Graham, Stephen, 2, 3, 11, 13, 55–65, 127, 131, 133,
 137, 176, 210
 Greece, 195–203

H

- Height, 2, 7, 64, 85, 87, 149, 206, 211
 Hong Kong, China, 7, 12, 55, 58, 61
 Housing, 12, 13, 55–58, 139, 153, 169, 205–207
 Human rights, 113, 117–119

I

- Image, 1–5, 10, 12, 13, 19–22, 33, 34, 40, 42, 43, 45, 48,
 58, 59, 69, 71, 74, 77, 79, 80, 86, 101, 103,
 111, 112, 114–118, 120, 138, 155–161, 167,
 171, 173, 179, 184, 185, 189, 191, 192, 196,
 197, 207
 Imaginary, 12, 13, 21, 44, 60, 64, 76, 78–81, 88,
 145–154, 168, 179–192
 Informality, 167, 169, 176
 Invisibility, 50, 61
 Invisible, 7, 11, 21, 33, 44, 48, 61, 62, 75, 86, 88, 90, 94,
 170, 191

K

- Kandinsky, Wassily, 12, 125–128
 Knowledge, 4, 19, 25, 26, 47, 50, 51, 71, 73, 76–81,
 101–103, 115, 117, 119, 120, 126, 149, 159,
 166, 168, 173–176, 200

L

- Landscape, 2, 3, 7, 9–11, 13, 14, 35, 46, 57–59, 61, 63,
 69–81, 89–91, 111, 141, 143, 146, 154, 156,
 157, 168, 171, 175, 176, 179, 180, 182–184,
 187, 191, 192, 197, 198, 205–212
 Latin America, 8, 58, 169, 184
 Lethal Autonomous Weapons (LAWs), 115
 London, 9, 21, 56, 57, 114, 115, 121, 138, 141–143

M

- Mapping, 3, 9, 11, 47–52, 70, 72, 73, 75–77, 80, 88–90,
 92, 93, 99, 106, 116, 117, 208
 Maroun, Rita, 3–5
 Military, 1, 11, 59, 69, 80, 85, 86, 88, 90, 93, 99, 105,
 106, 109, 113, 115, 118, 127
 Mobility, 6, 11, 13, 39, 55, 57, 58, 60, 64, 72, 75, 131,
 133, 167–173, 176, 205, 210

N

- Nature, 6, 10, 21, 25, 41, 42, 48, 49, 69, 71, 90, 102, 113,
 115, 117, 130, 149–150, 155, 180, 185, 202,
 206, 208, 209, 211, 212
 Nazi, 103, 105
 Neoliberalism, 138
 Nuclear, 11, 86, 88–94, 100, 111

O

- Olympics (megaevents), 185

P

- Painting, 7, 12, 26, 61, 125, 127–132, 134, 180, 182
 Parabolic, 10, 25, 32–34
 Pauwels, Luc, 1, 14
 Photography, 1, 4–7, 13, 21, 25, 55, 59, 69–71, 73, 101,
 115, 116, 129, 130, 138, 155, 160, 180–182,
 188, 189, 191, 192
 Planning, 11, 56–58, 63, 69–81, 174, 209
 Police, 20, 21, 125–128, 170, 200
 Politics, 2, 3, 10–12, 47, 52, 55, 58–62, 64, 65, 78, 80,
 85, 88, 99–107, 125–128, 137, 138, 195–203
 Practice-research/practice-based research, 12, 113
 Practices, 2, 3, 5–7, 10–13, 19–22, 25, 26, 48, 51, 52,
 69–73, 75, 76, 86, 88, 90, 93, 94, 101,
 109–121, 125–127, 129, 134, 143, 161, 171,
 176, 183, 184, 192, 206

Q

- Qatar, 63

R

- Radio, 10, 19–22, 91, 92, 102, 147
 Rio de Janeiro, 13, 165, 168, 172, 182, 184, 185, 190,
 206
 Rocket, 34, 104, 105
 Rocketry, 11, 99, 104, 105
 Rooftop, 6, 7, 13, 145, 166–176
 Russia, 58, 102, 115, 206, 207, 211

S

- Satellite, 1, 2, 10–12, 19–22, 55, 58, 59, 64, 69, 70, 73,
 99–107, 109, 111, 112, 115, 121, 125, 129,
 134
 Scaffolding, 3, 7–14

- Sense, 4, 6, 10–12, 25, 32, 33, 35, 42–45, 47, 50, 52, 57–59, 61, 62, 69, 71, 86–88, 92, 94, 99, 100, 107, 118, 125, 126, 130, 134, 137–139, 141, 143, 147, 148, 150, 165, 168, 169, 171, 184, 188, 191, 209, 212
- Sensing, 3, 9, 11, 12, 21, 22, 34, 64, 69–81, 85–94, 129
- Sensor/sensory (touch)/sensorial, 3, 4, 6, 10, 42, 45, 46, 50, 72, 76–78, 85–89, 92–94, 133, 137, 155
- Siberia, 14, 205–212
- Sight, 7, 32, 33, 73, 87, 116, 117, 176, 186, 189, 209
- Sky, 1–14, 21, 26, 27, 30, 56, 62–64, 72, 75, 81, 85, 91, 137, 139, 141, 143, 145, 146, 150, 180
- Skyscraper
 imaginary, 12, 145–154
 penthouses, 176
- Sociological, 2–4, 11, 14, 55, 63, 81, 137
- Sociology, 1–3, 14, 25, 58, 64, 72, 81
- Space (exploration), 11, 102, 104, 106
- Spaceflight, 10, 25, 31, 34, 35
- Street, 2, 7, 8, 39, 40, 56, 57, 146, 169, 170, 188, 189, 208, 209
- Surveillance (CCTV), 12, 41, 43, 55, 64, 93, 100, 105, 109–121, 126, 127, 129, 131–134, 189
- T**
- Technology, 1, 10–12, 19–22, 25, 36, 41, 43, 44, 47, 58, 60, 62, 71–78, 80, 81, 85–88, 91–94, 99–107, 109–113, 115–120, 125, 133, 145, 149, 150, 157, 195
- Topologies, 209
- Tourist, 3, 6–7, 9, 58, 61, 89, 168, 170, 171, 173, 188, 189, 192, 206, 209–212
- Touristification, 3, 14, 205–212
- U**
- UAV, *see* Unmanned aerial vehicles
- UNESCO, *see* United Nations Educational, Scientific and Cultural Organization
- United Nations Educational, Scientific and Cultural Organization (UNESCO), 26, 105, 111, 182, 183
- United States (USA), 1, 5, 43, 59, 75–77, 100, 102–106, 173, 192
- Unmanned aerial vehicles (UAVs), 59, 73, 74, 77, 115
- Urban, 3–14, 39, 40, 44–47, 51, 52, 55–64, 70, 72–74, 76, 77, 79, 81, 111, 137, 139, 141, 143, 145, 146, 150, 155, 156, 160, 161, 167–169, 173, 175, 176, 179, 182–184, 186–189, 195, 198, 206–210, 212
- Urbanisation, 49, 55, 60, 65, 137, 205
- Urbanism, 11, 43, 47, 52, 57, 69–81, 138, 139, 174, 176
- Urban navigation, 47–51
- Urban perception, 40–44, 47, 52
- Urban space, 2, 6, 41, 45, 55, 75, 161, 189, 192
- USA, *see* United States
- V**
- Vernacular heritage, 14, 206, 207, 211
- Vertical cityscape, 161
- Verticality, 1–14, 25, 27–37, 39–52, 58, 60, 71, 137–139, 145, 146, 149, 150, 168–170, 173, 174, 176, 183, 192, 208, 210–212
- Vertigo, 3, 4, 9, 10, 12, 27, 33, 35, 137–139, 141, 143, 212
- Visibility, 1–5, 11, 12, 31, 32, 35, 36, 47, 50, 51, 61, 86, 88, 92–94, 125–128, 137, 182, 183, 188
- Vision (logics), 130, 131
- Visual culture
 language, 25, 180
 production, 160
- Visualisation, 10, 41, 42, 48–52, 74, 106, 113, 129, 130, 133, 155
- Visual (sociology), 1–14
- Volume, volumetric, 1–5, 9–11, 14, 31, 64, 71, 72, 75, 76, 78–81, 85–94, 113, 130, 131, 169
- W**
- War, 1, 11, 12, 55, 58, 59, 89, 102, 105, 114, 116, 206
- Water, 6, 19, 30–33, 35, 36, 56, 58, 63, 165, 167, 172, 198, 201, 205–207
- Weapons, 63, 86, 103, 105, 112, 113, 115, 117, 119, 183
- Weather, 10, 21, 22, 61, 65, 73, 75, 92, 111
- Weightiness, 10, 25, 29–35, 37
- Weightlessness, 10, 25, 26, 29–35
- Wind, 6, 8, 13, 14, 75, 92, 100, 130, 139, 154, 195, 197–203, 212
- World Cup, 63
- Y**
- Yass, Catherine, 138–143
- Z**
- Zuev, Dennis, 1–3, 5, 6, 11, 14, 55, 69, 87, 88, 93, 171, 176, 205, 212