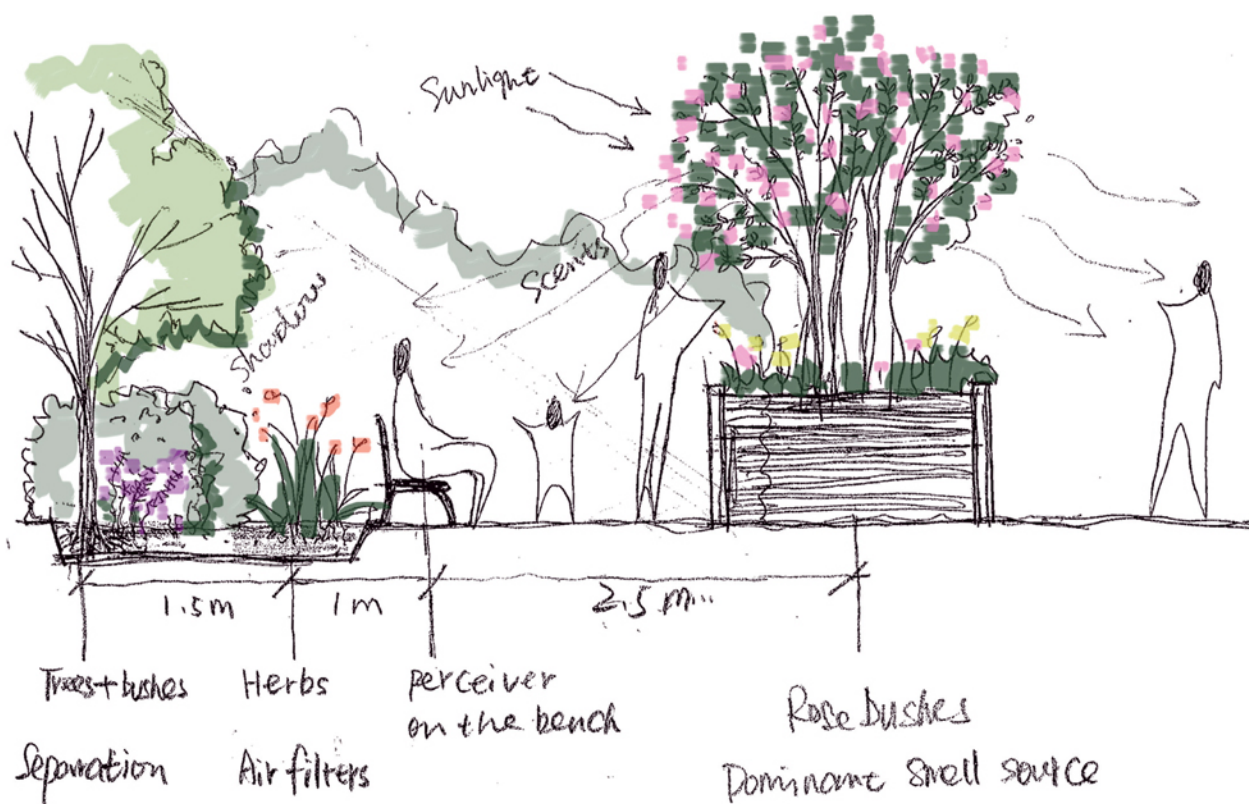


Designing with Smell

Practices, Techniques and Challenges



Edited by

Victoria Henshaw, Kate McLean, Dominic Medway,
Chris Perkins and Gary Warnaby

“Smell is perhaps the most potent and the least understood of the senses. It infuses all that we do, sending subtle and not-so-subtle messages that we do not just react to but think with. It is a vital part of how the spaces we inhabit are enlivened and made into what we count as real. It follows that smell can be actively designed and this book acts as both a primer and a guide to research in this vibrant area which holds such great potential for understanding how we understand space and, by extension, ourselves.”

Professor Sir Nigel Thrift DL FBA, Schwarzman Scholars Executive Director

“From the imagined smell of Cadiff’s sewers to the real (and fading) smells of Seoul Olympic stadium and the Artic, *Designing with Smell* surprises, challenges, and inspires its readers to reconsider what they know about smell and its role in our built and natural environments.”

*Holly Dugan, The George Washington University,
author of The Ephemeral History of Perfume*

DESIGNING WITH SMELL

Designing with Smell aims to inspire readers to actively consider smell in their work through the inclusion of case studies from around the world, highlighting the current use of smell in different cutting-edge design and artistic practices. This book provides practical guidance regarding different equipment, techniques, stages and challenges which might be encountered as part of this process.

Throughout the text there is an emphasis on spatial design in numerous forms and interpretations – in the street, the studio, the theatre or exhibition space, as well as the representation of spatial relationships with smell. Contributions originate across different geographical areas, academic disciplines and professions. This is crucial reading for students, academics and practitioners working in olfactory design.

The late **Victoria Henshaw**'s last post was as a Lecturer in Urban Design and Planning at the University of Sheffield, UK. Her research focused upon experiences and design of cities and buildings according to the senses, and smell in particular. Victoria led smellwalks in cities around the world, wrote the blog *Smell and the City*, and was author of *Urban Smellscapes: Understanding and Designing City Smell Environments* (2013). Victoria's work featured in broadcast, print and electronic media, including BBC Radio 4, *The New York Times*, *New Scientist*, *The Guardian*, *The Times*, *The Independent* and *Wired* magazine amongst others.

Kate McLean is Programme Director for Graphic Design at Canterbury Christ Church University, UK, and a part-time PhD candidate in Information Experience Design at the RCA, London. Her research through design investigates possibilities for rendering 'eye-visible' and communicating the space between a smell's source and the human nose through practices of smellwalking and smellscape mapping in cities around the world. She has published in *Leonardo* and *Communication Design* and her smellmap research has received international coverage, most recently in the *New Yorker*, BBC Radio 4 and the Australian Broadcasting Corporation.

Dominic Medway is a Professor of Marketing in the Institute of Place Management at Manchester Metropolitan University, UK. Dominic's work is primarily concerned with the complex interactions between places, spaces and those who manage and consume them, reflecting his academic training as a geographer. He has published extensively in a variety of leading academic journals, including *Environment & Planning A*, *Tourism Management*, *Journal of Environmental Psychology*, *Cities*, *European Journal of Marketing* and *Marketing Theory*.

Chris Perkins is Reader in Geography at the University of Manchester, UK, where he has taught since 1998, having previously run the university's map libraries. His research interests lie at the interface between mapping technologies and social and cultural practices, with ongoing research into performative aspects of contemporary mapping behavior, an interest in sensory mapping, and an emerging interest in play. Chris was Chair of the International Cartographic Association Maps and Society Research Commission, and is the author of numerous books and academic articles.

Gary Warnaby is Professor of Retailing and Marketing in the Institute of Place Management at Manchester Metropolitan University, UK. His research interests focus on the marketing of places and retailing. Results of this research have been published in various academic journals in both the management and geography disciplines, including *Environment and Planning A*, *Journal of Business Research*, *Journal of Marketing Management* and *European Journal of Marketing*. He was co-author of *Relationship Marketing: A Consumer Experience Approach*, co-editor of *Rethinking Place Branding*, and has contributed to numerous edited books.

DESIGNING WITH SMELL

Practices, Techniques and Challenges

*Edited by Victoria Henshaw, Kate McLean,
Dominic Medway, Chris Perkins and
Gary Warnaby*

First published 2018
by Routledge
711 Third Avenue, New York, NY 10017

and by Routledge
2 Park Square, Milton Park, Abingdon, Oxon, OX14 4RN

Routledge is an imprint of the Taylor & Francis Group, an informa business

© 2018 Taylor & Francis

The right of Victoria Henshaw, Kate McLean, Dominic Medway, Chris Perkins and Gary Warnaby to be identified as authors of this work has been asserted by them in accordance with sections 77 and 78 of the Copyright, Designs and Patents Act 1988.

All rights reserved. No part of this book may be reprinted or reproduced or utilized in any form or by any electronic, mechanical, or other means, now known or hereafter invented, including photocopying and recording, or in any information storage or retrieval system, without permission in writing from the publishers.

Trademark notice: Product or corporate names may be trademarks or registered trademarks, and are used only for identification and explanation without intent to infringe.

Library of Congress Cataloging-in-Publication Data

Names: Henshaw, Victoria, editor.

Title: Designing with smell : practices, techniques and challenges / edited by Victoria Henshaw, Kate McLean, Dominic Medway, Chris Perkins and Gary Warnaby.

Description: New York : Routledge, 2017. | Includes bibliographical references.

Identifiers: LCCN 2017017985 | ISBN 9781138955530 (hardback) | ISBN 9781138955547 (pbk.)

Subjects: LCSH: Smell in design. | Smell—Social aspects.

Classification: LCC NK1520 .

D473 2017 | DDC 745.4—dc23

LC record available at <https://lcn.loc.gov/2017017985>

ISBN: 978-1-138-95553-0 (hbk)

ISBN: 978-1-138-95554-7 (pbk)

ISBN: 978-1-315-66627-3 (ebk)

Typeset in Bembo

by Keystroke, Neville Lodge, Tettenhall, Wolverhampton

Dedicated to Victoria Henshaw, the original editor of this collection

CONTENTS

<i>List of Illustrations</i>	<i>xiii</i>
<i>Notes on Contributors</i>	<i>xvii</i>
<i>Preface: Simon Guy</i>	<i>xxv</i>
1 Introduction	1
<i>Kate McLean, Dominic Medway, Chris Perkins and Gary Warnaby</i>	
PART I	
Olfactory Art	5
Introduction	5
<i>David Howes</i>	
2 <i>Smell the City: A Participatory Art Installation</i>	9
<i>Victoria J. E. Jones</i>	
3 On Olfactory Space	19
<i>Gwenn-Aël Lynn</i>	
4 The Smell of Snow: Experiencing Wonderland through Multisensory Art	32
<i>Melissa Westbrook</i>	
PART II	
Representing Smell	39
Introduction	39
<i>Chris Perkins</i>	
5 The <i>GhostFood</i> Project: Enhancing Flavor through Personalized Smellscapes	43
<i>Miriam Songster</i>	

x Contents

- 6 Smellscape Narratives: Designing Olfactory Spaces as Infrastructure
for Embodied Storytelling 57
Julia Feuer-Cotter

- 7 Communicating and Mediating Smellscapes: The Design and Exposition
of Olfactory Mappings 67
Kate McLean

PART III
Smellscape Design and Monitoring 79

- Introduction 79
Jean-Paul Thibaud

- 8 The Design of Urban Smellscapes with Fragrant Plants and Water Features 83
Jieling Xiao, Malcolm Tait and Jian Kang

- 9 Stop and Smell the Flowers: Plant Scent in a Healing Forest Garden for
Patients with Stress-related Illness 96
Victoria L. Lygum

- 10 The Creation of Seoul Scent: Invisible Beauty 102
EunSook Kwon

- 11 Design with Smells: The Environmental Scientist's Perspective 111
Michael Bull

PART IV
Retail, Scent and Service Design 119

- Introduction 119
Charles Spence

- 12 Designing Smell into the Consumer Experience 123
Dominic Medway and Gary Warnaby

- 13 The Use of Scent in Out Of Home (OOH) Advertising 132
Prask Sutton

- 14 Scent and Brand Storytelling 140
Claire Sokell Thompson with contribution from Jo Barratt

- 15 Olfactory Control, Aroma Power and Organizational Smellscapes 148
Samantha Warren and Kathleen Riach

PART V	
Smell Learning Environments	157
Introduction	157
<i>Kevin Thwaites</i>	
16 Experiential Learning and Olfactory Architectures: Accommodating Smell in Teaching Practices in the Built Environment	161
<i>Victoria Henshaw</i>	
17 Culturalizing Scent: Current Steps towards Integrating the Sense of Smell in Art and Design Education	169
<i>Ashraf Osman, Claus Noppeney and Nada Endrissat</i>	
18 Olfactory Education in Art and Design	178
<i>Joanna Norman and Nicola Pozzani</i>	
19 Situating Olfactory Literacies: An Intersensory Pedagogy by Design	187
<i>Melanie McBride and Jason Nolan</i>	
PART VI	
Historic and Theatrical Smellscapes	197
Introduction	197
<i>Jonathan Reinartz</i>	
20 Inhaling Futurism: On the Use of Olfaction in Futurism and Olfactory (Re)constructions	201
<i>Caro Verbeek</i>	
21 A Dead Man's Nose: Using Smell to Explore the Battlefield of Waterloo	211
<i>Stuart Eve</i>	
22 Olfactory Design Elements in Theater: The Practical Considerations	219
<i>Michael McGinley and Charles McGinley</i>	
23 The Nose Onstage: Olfactory Perceptions and Theatrical Dimension	227
<i>Anna D'Errico</i>	
PART VII	
Smell Capture, Distillation and Diffusion	237
Introduction: Making Scents	237
<i>Alexandra Horowitz</i>	

xii Contents

24	A DIY Guide for Extracting Scent in Your Kitchen <i>Olivia Alice Clemence</i>	239
25	Scenting the Antiseptic Institution <i>Brian Goeltzenleuchter</i>	248
26	Indeterminate Ecologies of Scent <i>Debra Riley Parr</i>	259
	<i>Afterword: Jim Drobnick</i>	270
	<i>Index</i>	276

ILLUSTRATIONS

Figures

2.1	<i>Smell the City</i> : an olfactory exploration of city sewer fat	9
2.2	Sewer fat exhibit with explanation label	12
2.3	Victoria sniffs <i>Smell the City</i>	13
3.1	<i>Olfactory Path</i> installation layout, 2002	21
3.2	Scent diffuser from <i>Performance Olfasonore</i> , 2004	22
3.3	<i>Interactive Odour and Sound Installation</i> (2006), De Overslag exhibition, Eindhoven, the Netherlands	24
3.4	<i>Interactive Odour and Sound Installation</i> (2006), detail of kretek diffuser	25
3.5	<i>Audiolfactory Creolization</i> (2013), installation view, <i>Cultural Evolution, Migration, Hybridity, & Multiculturalism</i> , a group exhibition	27
3.6	<i>Audiolfactory Creolization</i> (2013), detail inside the rum scent diffuser	28
3.7	<i>Audiolfactory Creolization</i> installation layout, 2013	28
4.1	<i>The Smell of Snow</i>	35
4.2	<i>The Bad Flower</i>	35
4.3	Bill Ross' <i>Happy Birthday Alice 1</i>	36
5.1	<i>GhostFood</i> truck with servers	44
5.2	The Direct Olfactory Stimulation Device and 'chocolate' milk	45
5.3	A customer savors a <i>GhostFood</i> sample	46
5.4	Bye Bye Baby Cod	47
5.5	Serving <i>GhostFood</i> at the <i>Newark Open Doors Festival</i>	49
6.1	Accords of <i>Smell of Change</i>	62
6.2	Exploring the form of <i>Smell of Change</i>	63
7.1	Select sniffing sites for their smell potential – a wooden park bench in Pamplona	71
7.2	Moving from perceptual to cognitive appreciation of urban smell using purpose-designed 'smellnote' for <i>Scentscape 06, 2015 – Singapore</i>	72
7.3	Visualization of smelldata (detail) from urban smellscape map <i>Scentscape 06, 2015 – Singapore</i>	73
7.4	Audience sniffing bottled (natural) 'smells' of Edinburgh at <i>Edinburgh International Science Festival</i> , John Hope Gateway, Botanical Gardens, 2011	75

xiv Illustrations

8.1	Fragrant trees and plants in summer on Chuncheng Road, Kunming, Yunnan, China	86
8.2	Interpretation of the smellscape on Chuncheng Road, Kunming, China	86
8.3	Bitter orange trees in a neighborhood in summer, Central Athens, Greece	88
8.4	Interpretation of smellscape with bitter orange trees in Athens, Greece	89
8.5	The Sensory Garden in summer, Millhouses Park, Sheffield, UK	90
8.6	Interpretation of smellscape in the Sensory Garden, Sheffield, UK	91
8.7	Waterscapes along the Gold Route, Sheffield, UK	91
8.8	Urban context around Barker's Pool fountains	92
8.9	Interpretation of smellscape in the Alhambra Palace	93
9.1	The raised planting bed gives easy access to scented plants such as lavender, thyme and sage	97
9.2	In the evening, the honeysuckle fills the air with fruity sweetness	98
9.3	'Sensitive plant' delights the senses	99
9.4	The freshly cut wood strengthens the resinous scent which characterizes 'The Dark Forest Room'	100
10.1	Celadon incense burner, National Treasure 95	104
10.2	<i>Incense of Seoul: Pine Tree of Namsan</i>	107
10.3	Seoul Scent experience	108
10.4	SDO 2008 Air Dome	108
10.5	Transformed Seoul Olympic Stadium for SDO 2008 Platis Stadium	109
11.1	Population annoyance and odor concentration	115
11.2	Odor concentrations from an emission source	117
12.1	ScentAir's ScentWave device for releasing odor	125
12.2	The Singapore Airlines scented hot towel	126
18.1	<i>Scent No 1</i> by Sarah Hellen, 2014	181
18.2	<i>Tactile Fabric Vocabulary</i> by Niro Wang, 2014	181
18.3	Dr. Victoria Henshaw and Prask Sutton, <i>Design with Scents</i> , 2012	184
19.1	Author McBride smelling perfume vent, Aix-en-Provence, France	190
19.2	Prayer nut	191
19.3	DIY smellbox	192
20.1	Futurist exhibits at the <i>Something in the Air – Scent in Art</i> exhibition, Villa Rot, Germany	204
20.2	Students re-enacting <i>Tactile Dinner Party</i>	206
21.1	The Dead Man's Nose	213
21.2	Waterloo in context	214
21.3	Aerial view of Hougoumont	215
22.1	The 'power law' of two different odors	221
22.2	Ventilation system controls for the 2014 production of <i>Treasure Island</i> at the Theatre in the Round in Minneapolis, Minnesota	224
22.3	Scene from <i>Haunted Basement</i> (2010), 'Clown Stage'	225
23.1	<i>Duft, an Olfactory Metamorphosis</i> – in open air with perfumed fog	233
23.2	<i>Duft, an Olfactory Metamorphosis</i> – in open air with perfumed fog	233
23.3	Perfume jockey at work for the perfumed fog installation	234
24.1	Henning's smell prism	240
24.2	The <i>Grandma's Jumper</i> project	241
24.3	The steam-distilling kit	242

24.4	Alternative design for steam-distilling using two boiling glasses	244
24.5	A home distilling setup	245
25.1	<i>c</i> (pronounced /k/) <i>Boutique</i> , views from environment as installed at the Museum of Contemporary Art San Diego, 2010	250
25.2	<i>The Genre Series of Home Fragrances</i> , essential oil blends bottled in 6 oz mist sprayers	251
25.3	<i>Institutional Wellbeing: An Olfactory Plan for Oceanside Museum of Art</i> , exhibition view of the Meditation Room, 2009	252
25.4	<i>Institutional Wellbeing: An Olfactory Plan for Oceanside Museum of Art</i> , exhibition view of scent stations, 2009	254
25.5	<i>Sillage</i> , olfactory artwork launched at the Santa Monica Museum of Art, 2014	256
25.6	<i>Sillage</i> , olfactory artwork launched at the Santa Monica Museum of Art, 2014	258
26.1	Madeleine, Amy Radcliffe, 2013	262
26.2	Madeleine in operation, Amy Radcliffe, 2013	263
26.3	The oNotes application allows you to select scent tracks and play mood medleys in your personal space	267

Tables

5.1	Quotes from the participants	47
11.1	Acceptable distances for development in relation to odor sources	113
11.2	Hedonic odor scale	114
11.3	Hedonic scale of different smells	114
18.1	Typical constructions of traditional fragrance families within perfumery	180
21.1	The probable smells in each area and time period	216
21.2	The Dale Air scent corresponding to each smell	216

CONTRIBUTORS

Jo Barratt works in branding and graphic design. His popular podcast, *Life in Scents*, explores guests' lives through their scent memories. Jo has also worked with brands and performers to bring an awareness of the sense of smell to what they do, particularly in the music industry, resulting in scented events, performances and exhibition design.

Michael Bull is the Director leading Arup's global Environmental Consulting Practice. After research at Imperial College, where he gained his PhD, he has spent most of his career working in environmental consulting specializing in air quality and odor. He has published and spoken widely on these matters, looking to raise awareness of the capabilities of air quality and odor assessment. His work on odors includes the compilation of a detailed odor emission database, assessing the use of modeling for odor assessment and how well models can predict complaints, as well as undertaking odor assessments from a wide range of different activities.

Olivia Alice Clemence embarked upon her research into scent and design whilst studying at Goldsmiths College, London. She received a first class honors degree in Design, and has subsequently created her own distilling kit, developed her own scents, and exhibited them at the London Southbank Centre, Milan Design Week and Kensington Palace. More recently her practice has explored relationships between scent and food, and she has been working alongside a chef to distil food scents prior to cooking, to explore the potential of adding the essence back to the dishes. Olivia also works at the Institute of Making at University College London.

Anna D'Errico is a neuroscientist at the Max-Planck-Institut für Biophysik, Frankfurt and at Goethe Universität Frankfurt, and an independent performer. She obtained her PhD in Physiology and Neuroscience at the University of Pavia, Italy. As a performer and dancer she studied several techniques, and has practiced dancetheater since 2004, following the theoretical and practical approach of theater anthropology. She works on the physiology of olfaction and on the aesthetical dimension and practical applications of odor in theatrical and performance space. She is a contributor to various science websites and magazines in Italy and Switzerland, and is the author of *Il senso perfetto*, a bilingual (Italian/English) blog about smell and olfaction.

Jim Drobnick is a critic, curator and Associate Professor of Contemporary Art and Theory at OCAD University, Toronto. He has published on the visual arts, performance, the senses and

xviii Contributors

post-media practices in anthologies such as *The Multisensory Museum* (2014), *Senses and the City* (2011) and *Art, History and the Senses* (2010), and in journals such as *Angelaki*, *Canadian Theatre Review*, *High Performance*, *Parachute* and *Performance Research*. He edited the anthologies *Aural Cultures* (2004) and *The Smell Culture Reader* (2006), and recently co-edited special thematic issues of *Public* (2012) and *The Senses & Society* (2012). In 2012, he co-founded the *Journal of Curatorial Studies*. He is a co-founder of DisplayCult, a curatorial collaborative (www.displaycult.com). He is working on an upcoming book on smell in contemporary art.

Nada Endrissat is Assistant Professor at Bern University of Applied Sciences, Switzerland. She studied Psychology at Free University of Berlin, and received her PhD in Management from the University of Basel in Switzerland. Her current research interests include organizing and artistic practices in the creative industries.

Stuart Eve is an Honorary Research Associate at the Institute of Archaeology, University College London. He specializes in using mixed reality techniques to aid in landscape-based archaeological investigations. By creating innovative delivery mechanisms that combine sight, sound and smell, he aims to get closer to the experiences of people in the past. He is also a founding partner of L-P: Archaeology, a commercial archaeology company specializing in using digital techniques to aid in the archaeological process.

Julia Feuer-Cotter is a PhD student in geography at the University of Nottingham with an interest in the roles of smellscape for human–environment interactions, and specifically the realities and imagination of Arctic infrastructure. Her work explores everyday sensory practices through an open, creative and practice-based approach in the form of community-based workshops, storytelling, and interacting with recreated smellscape. Her research aspires to contribute to our understanding of diverse Arctic micro-geographies, in which the experiences of the region's inhabitants play the foremost role, and to explore the complex connections between sensed reality and geographical imagination.

Brian Goeltzenleuchter is an artist based in San Diego. His recent projects investigate the use-value of cultural objects and institutions. In 2001 Brian received his MFA from the University of California, San Diego. He was Associate Professor of Art at Central Washington University. He is currently a Research Fellow at the Institute for Public and Urban Affairs at San Diego State University, and Artist-In-Residence at the Institute for Art and Olfaction in Los Angeles. His work has been screened, performed and exhibited throughout the United States, Canada, Austria, Italy, China, Croatia and the Netherlands.

Simon Guy is Professor of Design and Society and Dean of the Faculty of Arts and Social Sciences at Lancaster University. His research explores the co-evolution of art, design and development in the pursuit of sustainable urban futures. His work is inter-disciplinary and collaborative, most recently working with sculptor Wolfgang Weileder on an Arts and Humanities Research Council project, *Jetty*, which explored the role of public art in generating public debate about urban sustainability, and led to the publication of the edited volume *Catalyst: Art, Sustainability and Place in the Work of Wolfgang Weileder* (2015).

Alexandra Horowitz is a Professor of Animal Behavior and Cognition at Barnard College, Columbia University, and the author of *Inside of a Dog: What Dogs See, Smell, and Know* (2009) and *On Looking: Eleven Walks with Expert Eyes* (2013). The Horowitz Dog Cognition Lab at

Barnard College conducts research on a wide range of topics, including dog olfaction, inter-species play behavior and attributions of secondary emotions to dogs. In addition to many scholarly articles relating to dog behavior and cognition, she writes regularly for *The New York Times* and other publications.

David Howes is Professor of Anthropology at Concordia University, Montreal, and the Co-Director of the Concordia Sensoria Research Team (CONCERT). He has conducted field research on the cultural life of the senses in Papua New Guinea, northwestern Argentina, and the southwestern United States. He recently completed a project exploring the sensory life of things in the Pitt Rivers Museum, Oxford. Recent publications include: *Ways of Sensing: Understanding the Senses in Society* (2013), co-authored with Constance Classen; the edited collection *A Cultural History of the Senses in the Modern Age, 1920–2000* (2014); and a special issue of the journal *The Senses and Society* on “Sensory Museology” (2014).

Victoria J. E. Jones is an artist and researcher whose main interest is the ways people connect with one another through common, universal experiences. She is particularly focused on how people understand and make sense of place. Victoria creates multi-sensory artworks that intersect place philosophy, installation, performance and participatory art. A graduate of Fine Art at Camberwell College of Art, Victoria’s work has been shown in the UK and internationally.

Jian Kang is Professor of Acoustics at the University of Sheffield. He is distinguished by his work in architectural and environmental acoustics, evidenced by numerous engineering consultancy projects, funded research projects and publications. His work on acoustic theories, design guidance and products has brought major improvements to soundscape design in urban areas. He chairs the Technical Committee for Noise of the European Acoustics Association, the WUN (Worldwide Universities Network) Environmental Acoustics Network; and EU COST Action on Soundscape of European Cities and Landscapes. He was awarded the John Connell Award 2011, and UK IOA Tyndall Medal 2008.

EunSook Kwon, a professor and director, has developed the curriculum of the new Industrial Design program at the Gerald D. Hines College of Architecture, University of Houston, since 2003. She has published and lectured throughout the world about creative design thinking and design strategy development. She has been a consultant to numerous corporations, and has developed educational programs for government agencies and corporations. She was appointed Director General of Seoul Design Olympiad 2008, a design and cultural event with 86 programs. Two million visitors participated in the 21 days of design exhibitions as part of a festival. She was selected twice in DesignIntelligence’s list of ‘Most Admired Educators’ in architecture, industrial design and interior design in 2011 and 2015. In 2015, DesignIntelligence recognized Kwon for “her insight to nurture and grow the program with her vision and passion.”

Victoria L. Lygum is Assistant Professor at the Department of Geosciences and Natural Resource Management at the University of Copenhagen. Her expertise is within Landscape Architecture, with a focus on evidence-based design. Her current research interests include healing gardens at crisis shelters for women and child survivors of domestic violence. She has also been involved in a research project about a healing forest garden for patients with stress-related illnesses, where she had a focus on designing with smell. She is EDAC-certified (Evidence-based Design Accreditation and Certification) from the Center for Health Design.

xx Contributors

Gwenn-Aël Lynn, after having spent the previous decade focusing on sculpture and installation, in the summer of 2000 collaborated with a dancer and a musician on a performance where the scent of beeswax was prevalent. In 2002, Gwenn-Aël created *Olfactory Path*, his first olfactory installation. In 2005 he was awarded an artist residency in the Netherlands, where he created *Interactive Sound and Smell Installation*, his first work where technology played a prominent role. Since then he has continued to build interactive installations and performances that articulate scent, sound and technology to problematize the relationship between identity, culture and the political.

Melanie McBride is a Canadian educator and a researcher with Ryerson University's Responsive Ecologies Lab (RE/Lab) in Toronto. She is currently a PhD candidate in York University's joint program in Communication and Culture. Melanie's doctoral research investigates ecologically situated approaches to inquiry-based learning with aroma materials and sources. She can be found online at melaniemcbride.net

Charles McGinley is the Technical Director of St. Croix Sensory. He has a BS in Chemical Engineering from the University of Minnesota (1970) and an MBA from St. Thomas University in St. Paul, Minnesota. As founder of St. Croix Sensory, Charles provides technical direction to the laboratory. His vast experience in mass transfer and air distribution systems is utilized in designing scenting systems.

Michael McGinley is the Laboratory Director of St. Croix Sensory. He has a BS in Chemical Engineering from the University of Minnesota (1995) and an MS in Environmental Health Engineering from Johns Hopkins University School of Public Health. His work at St. Croix Sensory involves overseeing daily laboratory operations, including environmental air and product odor evaluations and directing research in olfactory art and design.

Jason Nolan is Director of the Responsive Ecologies Lab, and Associate Professor in Early Childhood Studies at Ryerson University, Toronto. His research focuses on multisensory technologies, adaptive design for children with disabilities, children's play, privacy and autonomy. His work has appeared in journals such as *Information, Communication & Society*, *New Media & Society*, *Surveillance and Society* and *Canadian Children*. He was co-editor of *The International Handbook of Virtual Learning Environments* (2006).

Claus Noppeney is a professor at Bern University of Applied Sciences. Claus' research investigates the role of the senses, and in particular smell, for organizing practices in the creative industries. This interest has recently focused on the context of scent development, with three Swiss National Science Foundation-funded projects into materiality, sense-making and processes of culturalizing in the perfume industry.

Joanna Norman is a postgraduate lecturer at Kingston University, London, and a consultant/founding director of Pandora (www.pandoraltd.com), providing independent training and consultancy within the fragrance industry. She graduated from the Royal College of Art with an MPhil, where she researched the link between the luxury industries of fashion and fragrance. Joanna was trained professionally in London and Paris at leading supplier International Flavours and Fragrances, encompassing all aspects of fragrance development. Recent projects include *Marty the Mighty Nose*, introducing primary school teachers to extend learning using the sense of smell, and chairing the Jasmine Awards Judges, pursuing excellence in fragrance journalism.

Ashraf Osman is the founder-director of Artinect, a consultancy that connects art and people, virtually and physically, and Scent Art Net in Switzerland, a think-tank focusing on the cultural aspects of smell. He is also an advisor for the Institute for Art and Olfaction in Los Angeles and a judge for the Experimental category of its Art and Olfaction Awards. He recently curated a year-long Olfactory Exhibition series at Kunstmuseum Thun in Switzerland (in cooperation with Scent Culture Institute). He is currently working on a traveling project, in partnership with Givaudan, titled *Scents of Exile*.

Debra Riley Parr has a PhD from Boston University and is Associate Professor of Art and Design History at Columbia College Chicago. She has presented several conference papers on scent, conducted workshops on olfactory experience, and curated an exhibition entitled *Volatile!* on poetry and scent for the Poetry Foundation. She is currently writing a book on scent in art and design practice, and was recently awarded a research travel grant to work in residency at the Chemical Heritage Foundation in Philadelphia.

Nicola Pozzani is a Lecturer at Kingston University, London, Faculty of Art, Design & Architecture, and at the Y Institute, Bern University of the Arts, Switzerland. He is the Founder of S Sense (www.ssense-perfume.com), specializing in cross-sensory fragrance education and innovation. Nicola studied Science of Perfume under Master Perfumer Jean-Claude Ellena at the Università dell'Immagine of Milan before working for global perfume companies Symrise and LVMH. Together with Perfumers Les Christophs he has created the Duft-Visions perfume workshops in Berlin, and he has been a guest speaker for the Scent Marketing Institute in NYC and the British Society of Perfumers, amongst others.

Jonathan Reinartz is Professor of the History of Medicine and Director of the Social Studies in Medicine Unit at the University of Birmingham. He has published extensively on the history of hospitals and medical education, and in 2017 was elected President of the European Association for the History of Medicine and Health. Jonathan has additional research interests in the senses and smell, specifically as author of *Past Scents: Historical Perspectives on Smell* (2014).

Kathleen Riach is Associate Professor in Management at Monash Business School Australia. Her main research explores the unspoken, affective experiences of work, with a focus on ageing, bodies and the senses. Her work has been published in internationally renowned journals across the social sciences, including *Organization Studies*, *Urban Studies* and *Sociology*, and has been featured in a variety of national and international media and policy arenas, including the United Nations and the BBC. She is currently working on a project exploring the menopause at work.

Claire Sokell Thompson is the founder of the sensory brand agency Vetyver. Her work in strategic and creative direction has spanned most sectors: retail, travel and leisure, luxury, digital and telecommunications. During her career she has developed in-depth and innovative work in less traditional areas of sonic, naming and intellectual property, tone of voice, cultural training, digital, customer journeys and brand experience, and in the development of fragrances.

Miriam Songster is an artist and designer who engages with the themes of minimalism, site-specificity and the multi-faceted nature of sensory perception. Her practice includes sculpture and video as well as installation- and scent-focused immersive works. Miriam's work has been funded by the Robert Rauschenberg Foundation and the New York Foundation for the Arts, and shown in the US, Germany, Iceland and China. She recently contributed to *Protein Journal*, and has received

xxii Contributors

widespread press coverage from such diverse publications as *Hyperallergic*, *Forbes* and *The Japan Times* for the installation *GhostFood*. She is based in Brooklyn, New York.

Charles Spence is Professor in Experimental Psychology and Head of the Crossmodal Research Laboratory at the University of Oxford. He is interested in how our brains process the multisensory information that fills our daily lives, and the implications for the way in which we design everything from household products to mobile phones, and from the food we eat to the places in which we work and live. Over the years Charles has consulted for a number of multinational companies, has published over 500 scientific journal articles, and has received major awards, including the 2008 Ig Nobel Prize for Nutrition.

Prask Sutton studied Physics and Astronomy as an undergraduate at University College London, and the History, Philosophy and Public Understanding of Science as a postgraduate at the London School of Economics and Political Science. Shortly thereafter he embarked on a career in advertising. He is currently Co-Founder and Chief Innovation Officer at Nock, a London-based agency innovating through creative solutions and interaction design within the marketing and advertising sector. Specializing in multisensory and creative technologies, he has been both a pioneer and advocate of olfactory marketing, behind the most cutting-edge scent delivery technologies and methodologies currently used in Out of Home. Outside of Nock, Prask has founded and co-founded a number of tech startups as well as acting as non-executive director to companies both within and outside the marketing and advertising industries. As a futurist, he also speaks on the subject of emergent and yet to be realized technologies and their potential impact on society, humankind and the Universe at large.

Malcolm Tait is Senior Lecturer in Town and Regional Planning at the University of Sheffield. His research focuses on the means by which places are planned, designed and made. In doing so, he seeks to uncover how the relations between those actors involved in the processes of place-making are constructed and mediated through institutional forms. His previous research has investigated the design and planning of urban villages and how communities develop within them, the relations of trust between those involved in design control, and most recently, the processes by which environments are designed for older people.

Jean-Paul Thibaud, sociologist and urban planner, is a researcher at CRESSON (Centre for Research on Sonic Space & Urban Environment). His field of research covers the theory of urban ambiances, ordinary perception in the urban environment, the social anthropology of sound and the sensory ethnography of public places. He has directed the CRESSON research laboratory, and is currently Co-director of the International Ambiances Network (www.ambiances.net). Jean-Paul has published numerous papers on urban ambiances, and has co-edited various books on this field of research.

Kevin Thwaites graduated in Landscape Architecture at Leeds Metropolitan University in 1983. Since then, he has worked in private practice and higher education, completing a PhD in 1999. Prior to moving to the University of Sheffield in 2003, he was Course Leader for Undergraduate Programmes in the Landscape Architecture Department, Faculty of Health and Environment, Leeds Metropolitan University. He now researches and teaches in the Faculty of Social Sciences at the University of Sheffield, where his work is focused on the development of theory and practice in experiential landscape, and socially restorative urbanism. His research interests include the philosophy and theory of landscape design, the relationship between spatial organization and experience, and its impact on design languages and processes.

Caro Verbeek is a researcher and curator. She did an MA in Art History and in Curatorial Studies, and is currently a lecturer at VU University, Amsterdam. She teaches the preliminary course ‘The Other Senses’ at the Royal Academy of Art, The Hague (KABK) and is an embedded researcher at the Rijksmuseum, Amsterdam, and International Flavours & Fragrances. Verbeek creates olfactory tours for museums. She is also the author of *Something in the Air: Scent in art* (2015) on the history of olfactory art.

Samantha Warren is a Professor of Management, Employment and Organization at Cardiff Business School, UK. She has been interested in sensory methodologies since using photography to research organizational aesthetics, space and fun in contemporary workplaces in 2001. She is a co-founder of the inVisio visual research network, and co-editor of *The Routledge Companion to Visual Organization* (2014). Her interest in the olfactory arose through collaboration with Kathleen Riach on a British Academy-funded project to explore smell in office environments. This work was recently published in *Human Relations*.

Melissa Westbrook is an Australian-born curator and art historian. Founder of an international art movement called The Neo-Outsiders, she has a distinctive voice in the insider/outsider art debate, and actively promotes self-determination. Her unique exhibitions, which incorporate adult and children’s pieces, champion the idea that art of all styles – and from all ages – can inspire us. Through her exhibition projects, Melissa devised a series of multisensory art classes. Known as *The Literary Workshops*, they use art, literature, drama, music, touch and smell to encourage participants to engage all of their senses in their creative processes.

Jieling Xiao is a doctoral candidate at the University of Sheffield, and is currently working on a cross-cultural smellscape study in public transport hubs in the UK and China. This work provides insights to improve sensory environmental quality by designing smellscapes from an in-depth understanding of human perceptions. Jieling obtained a master’s degree in Urban Design from University College London, and a bachelor’s degree in Architecture at Wuhan University of Technology, China. She has a particular interest in place-making through human sensory experiences and everyday life culture in cities.

PREFACE

That this is what we fear – no sight, no sound,
No touch or taste or smell, nothing to think with,
Nothing to love or link with . . .

from the poem Aubade by Philip Larkin

Victoria Henshaw was a pioneer in the field of sensory urbanism, adding her passionate voice to a critique of rational planning and ocular-centric design that marginalizes the sensual experience of cities. For Victoria, it was not enough to think about and look at cities as expert observers, situated in an architectural office, a planning department or a university. Instead, her work calls for us to engage with cities as explorers, to open ourselves to a richer urban experience and ultimately to become everyday designers who own, occupy and order our own environments. Victoria was just such an engaged ethnographer, who treated every urban encounter as a new perceptual experience that gives fresh meaning to the city.

Victoria developed, distilled and disseminated this sensory ethnography through her academic positions at the Universities of Salford, Manchester and Sheffield, and also through her professional life as an active member of the design community, working for over 13 years as a practitioner in urban development and management, where she was a founding member and Chair of the South Yorkshire Design and Architecture Centre. This crossing of professional and academic boundaries was key to her work, through which she sought to bring together and influence both theoretical debate and design practice. Her doctoral research involved undertaking ‘smellwalks’ with built environment professionals such as architects, urban designers, planners and engineers, investigating relationships between smell and place perception, and identifying factors by which such actors might begin to incorporate a more proactive approach to odor in city design and management. She subsequently organized smellwalks in cities across the UK, mainland Europe, North America and Montreal, Canada, and led the delivery of a cross-disciplinary project, *Smell and the City*, at the University of Manchester. This research culminated in her book *Urban Smellscapes: Understanding and Designing with Smell in the City* (2014), which established her as a leading international authority in the field and provides the methodological framework and intellectual agenda for this collection.

In the conclusion to her book, Victoria noted the limited exploration of smellscape experience and design internationally, and the need for more work in exploring the transition from theory to practice. This book answers her call, and provides the next chapter in this debate and a rich set of

xxvi Preface

studies to complement and extend Victoria's work. If we are serious about designing what Victoria termed "more humanistic places for the future," then we should celebrate and connect with Victoria's urban smellscape through this book and through our own ethnographies. I can think of no better tribute to an inspiring and much missed sensory scholar.

Professor Simon Guy
Lancaster University, August 2016

PART III

Smellscape Design and Monitoring

INTRODUCTION

Jean-Paul Thibaud

Is there such a thing as a ‘smellscape,’ and if so, is it possible to design and monitor it? By asking this question, we are required to specify what we understand by ‘smellscape’ and to reconsider the very idea of ‘design.’ The four chapters presented in this part offer diverse responses and describe numerous case studies related to both of these issues.

One could imagine that an olfactory environment is simple to decipher and monitor: on the one hand an environment that ‘smells good’ and needs to be promoted, and on the other hand one that ‘smells bad’ and should be prohibited. After reading the chapters presented here, the question is revealed to be more complex and certainly more interesting and subtle.

To start with, it is important to notice that odor alone is never sufficient to evaluate and characterize a smellscape. At least three additional aspects should be fully considered. First, we have to acknowledge the fact that sensibility to odors depends very much on individuals and groups. The olfactory sense is more or less developed depending on people, but an appreciation of an odor can also be very diverse. Hence, a smellscape involves not only odors, but also the experience of odors and the relationship we have with them. Secondly, one needs also to consider the role of context: as Michael Bull shows in Chapter 11, an odor can be pleasant or unpleasant depending on its concentration and combination with other odors, depending also on the place, the time and the activity during which it is experienced. Thirdly, as Jieling Xiao, Malcolm Tait and Jian Kang show in Chapter 8, smellscape cannot be dissociated from the other senses such as vision, sound, taste and touch. Hence, a smellscape involves an experienced situation as a whole; it has to be considered from an inter-sensorial perspective. Moreover, designing a smellscape brings stimulating issues and involves new questions related to the field of design. Let me mention and emphasize five of them.

First: Integrating Cultural Know-how

At first glance, smellscape design seems to be a new kind of activity, a contemporary project which stems from the growing interest in the senses. After reading these chapters, it becomes obvious that such an idea is incorrect. Not only do we learn that odorization has been more or less appreciated depending on cultures, but it also becomes clear that certain ancient traditions have developed unique sets of practices regarding the world of smells. Korean smellscape are charted by EunSook Kwon in Chapter 10, and China and Japan also immediately spring to mind as demonstrating a

rich and unique olfactory cultural tradition, but other traditions could also be mentioned. What is interesting here is that such cultures have also invented material devices and promoted specific know-how, be it, for example, burning incense described by EunSook Kwon, or using fragrances in gardening, evidenced in Victoria Lygum's Chapter 9. It is also worth noting that the use of smell is often closely related to rituals and religious ceremonies. Hence, smellscape is part of a cultural heritage that crosses the boundaries between materiality and spirituality.

Second: Paying Attention to the Background

Composing with odors demands careful consideration of the role of attention, and also that of background levels. Often taken for granted or supplanted by other sensory phenomena, the world of smell tends to be forgotten in everyday life. It is mostly noticed when it becomes a public problem and involves a form of nuisance or disturbance, as is demonstrated by Michael Bull in Chapter 11. But what happens when such is not the case? Smelling is not only passive – a mere reception of an olfactory environment – but also active. It relies on the act of breathing, inhaling and exhaling, and this activity can be enhanced, become intentional and be traced back to consciousness. One of the challenges for designers is to produce a smellscape that will be fully experienced. A complete vocabulary can be used to account for smell thresholds and sensitivity to odors. This smell environment is described and acted upon in terms of detection, concentration, dilution and dispersion. Hence, smellscape design highlights the importance of sensory background in the experience of an environment.

Third: Producing All Sorts of Effects

When designing a smellscape, one does not intend to only create a pleasant and comfortable environment, but may also aim at producing more specific effects. Such effects can be very diverse, tending to reduce stress or calm people, as described by Victoria Lygum (Chapter 9), to produce a sense of sacredness, to purify the air and the surroundings, to mark the space and foster urban identity, to attract visitors or passers-by, to trigger memories and past experiences (one could add to encourage shopping and consumption). Well-being is, of course, at the core of this activity, but odors may also concern the fields of health and therapy (see Chapter 9), architecture and urban planning (see Chapter 8) sociability and religion, or business and marketing (described in Part IV). Thus, the aesthetic dimension of smellscape has to be articulated in all its diverse pragmatic and praxiological dimensions. The need to design a smellscape, and the various consequences of such a project, can also raise political issues as well as ethical ones, since odors can be effective without a fully conscious perceiver.

Fourth: Composing with the Elements

Natural elements seem to be the primary means by which designers create and monitor smellscapes. Flowers, trees and all sorts of green spaces diffuse specific odors and contribute to composing an olfactory environment. For instance, orange trees and other fragrant plants have the ability to pervade a place with odors, and their design potential is explored in Chapter 8 by Jieling Xiao, Malcolm Tait and Jian Kang, who also discuss the role of water in the diffusion and transmission of aromas. Waterscapes produce several effects and involve diverse modes of action that are important in order to monitor a smellscape: running water may accelerate ventilation, increase air humidity and bring a sense of freshness. Last but not least, air is the medium *par excellence* of the propagation of odors. This is maybe one of the most difficult problems encountered by designers:

how to master air movements and airflows that are very labile, unstable and transient by nature? We have just seen that water can be very useful, but the built environment is also to be considered. Urban forms rely on different types of boundaries or semi-closed spaces that can confine odors and limit their dispersion. In Chapter 10, EunSook Kwon considers this issue in the case of cultural festival site design. They also involve corridors and streetscapes that can orient and channel air movements. Thus, the monitoring of odors described by Michael Bull (Chapter 11) needs to understand the complex interaction between the materiality of a built space and the atmospheric dimension of a smellscape.

Fifth: Designing in Accordance with the Weather

Because smellscape design relies on air and elements, weather is a key feature of this kind of design. Humidity, temperature and wind, rain or dryness, affect the nature and the experience of an olfactory environment. One of the most stimulating lessons to learn from smellscape design is that it cannot be identical anywhere and any time. One will not design the same way in a place subject to a tropical climate, a continental, mild or polar one. Jieliang Xiao, Malcolm Tait and Jian Kang's use of different cases in Chapter 8 illustrates this great diversity. The weather conditions are not the same, neither are the flora or the sensitivity to seasonal cycles. Geographical situations and seasonal change determine largely what it will be possible to do in terms of design and planning, and consequently three important implications emerge. First, designing a smellscape means designing space-time. These two dimensions – space and time – are inseparable, since the olfactory resources of a place depend very much on the weather and the season. Secondly, I am referring to a temporality that is cyclical and not linear. Smellscape design is not only subject to variation and transformation, but also to a periodic return, one season after the other. Thirdly, entering the era of the Anthropocene, smellscape design has an important role to play in order to sensitize inhabitants to climate change. Because it is so fundamentally embedded in natural conditions, smellscape design can help to raise awareness by creating new olfactory experiences significant of our time period, which were explored earlier by Miriam Songster in Chapter 5.

Finally, smellscape design is at the crossroads of numerous issues related to the contemporary environment. Situated between quality of life and sensory marketing, health concerns and ecological challenges, it is particularly effective perhaps because of this discrete but integrative intellectual and practical location. Moreover, dealing fundamentally with ambient and atmospheric phenomena, and with diffuse and invisible components, smellscape design can lead to a fresh questioning of what design is all about. The chapters in this part demonstrate this potential and show how design can be a way of immersing in life, pervading bodies and places, and enhancing everyday sensory experience.

8

THE DESIGN OF URBAN SMELLSCAPES WITH FRAGRANT PLANTS AND WATER FEATURES

Jieling Xiao, Malcolm Tait and Jian Kang

Designing urban smellscape with aromas of natural elements can bring restorative effects to people's daily life in cities. People tend to prefer smells derived from natural elements, especially smells of plants and water (Henshaw, 2014; Moncrieff, 1966). In particular, these smells are found to have a significant positive influence on people's health, emotions, memories and perceptions of places (Bringslimark, Hartig & Patil, 2009; Chen, Chen & Yin, 2007; Henshaw, 2014; Porteous, 1985; Tuan, 1979). The cleansing and freshening effects brought about by water also can result in positive impacts on people's general experiences within urban spaces, so greenscapes and waterways are suggested as two main categories of restorative smell sources, which may aid in promoting higher-quality environments (Henshaw, 2014). In landscape designs, plants and water are also essential elements (Booth, 1989), allowing landscape architects to improve visual aesthetics, shape spaces and provide shading. Some plants, such as rose, jasmine and lavender, produce fragrant scents enjoyed by people, which can also mask negative smells. Water features have also been found to attract people visually, as well as cleaning the air and modifying the microclimate by increasing humidity, reducing temperature and changing wind speed, thus changing surrounding smellscape (Booth, 1989; Kang, 2012; Henshaw, 2014). This chapter reviews principles and practices of using fragrant plants and waterscapes in urban spaces, particularly through four cases using these elements in the design of smellscape. Within these discussions, it is argued that urban vegetation and water features significantly influence the general smell environment, and may play a more important role as climate change increases city temperatures, necessitating greening of streets and public spaces.

Design with Fragrant Plants and Waterscapes: Principles

Application of Fragrant Plants and Waterscapes in Landscape Design

Fragrant plants are widely found across many countries. For example, people in China and Japan have a long history of using fragrant plants in gardening (Liu, 2005). In Chinese landscape practice, fragrant trees, vines and herbs are deployed, with scents that may be floral, fruity, wooden or leaf-like, and with varying smell intensities and functions (Chen et al., 2013; Gu & Zhang, 2010). Smells from fragrant plants are suggested to offer therapeutic functions in some clinical practices of aromatherapy: for example, lavender may reduce stress and calm people (Buchbauer, Jirovetz & Jäger, 1991; Diego et al., 1998). Although some have argued that little scientific evidence supporting

aromatherapy has been found in laboratory experiments (Cooke & Ernst, 2000), positive influences have been observed from physical, psychological and social studies through interactions between people and smells of plants in many other studies (Bringslimark et al., 2009; Classen, 2013; Elings, 2006). Introducing fragrant plants into urban spaces in this sense may bring benefits to people beyond visual aesthetics.

In many countries, theme parks and farms of fragrant plants are also successful in attracting tourists at blossom seasons, such as the UK's Mayfield Lavender Farm, and flower fields in Furano, Japan and Grasse, France. However, in most cases, fragrant plants are mostly planted in private gardens or indoors at small scales, rather than as basic urban elements at large scales. Recently, fragrant plants have been used as an alternative way of improving environmental qualities in urban spaces in many Chinese cities, like Kunming, Guangzhou, Xi'an and Xiamen. They have been largely planted along streets, and in community gardens, hospitals and theme parks. The actions of bringing fragrant plants into urban spaces in such cities has, according to its promoters, achieved positive effects on people's living qualities, creating unique urban identities and attracting tourists through smells (Gu & Zhang, 2010). Such efforts demonstrate that fragrant plants can create spaces where people want to visit and linger, with potential lessons for designers of the urban public realm.

Unlike fragrant plants, water normally does not produce a smell. However, people can sense freshness from water, as it increases air humidity and wind speed, thus affecting smellscape (Henshaw, 2014). There are many cases of fountains serving as essential visual urban elements in historical European cities, like Rome and Paris, and modern water features in cities are designed and used for multiple purposes: recreation, irrigation, climate control and to mask traffic noise (Booth, 1989). However, their influence on smellscape has largely been ignored. This chapter will discuss, using examples, how different types of waterscapes can inform smellscape design in public spaces.

Urban Smellscape Design Principles and the Challenges of Using Fragrant Plants and Waterscapes in Urban Spaces

Human perceptions of the smell environment are inevitably influenced by other sensory mediations (Porteous, 1985). Smellscape design cannot be separated from other sensory elements, such as vision and sound. Many designers concentrate on auditory, visual and tactile perceptions when bringing plants and water features into urban spaces. However, it is important to identify the full range of sensory impacts in urban spaces. Realizing the potential of fragrant plants and running water features to achieve restorative effects with smells is an important, but little understood, strategy for the landscape architect, and one that needs to be guided in a systematic way.

A number of general principles might guide the design of urban smellscape with fragrant plants and running water. Moncrieff (1966) summarized four general principles of improving the smell environment: separation, deodorization, masking and dilution. Henshaw (2014) then developed these into sequential basic design and management principles: separating odors through planned activities or displacement; removing unpleasant odors, like smells of dirt and waste; masking any remaining unpleasant odors with pleasant smells to hide the original ones; and introducing an odor with a special quality to create new characteristics for the space. A number of environmental aspects are also suggested as important, including air movement and microclimates, activity density and concentration, and materials and topography (Henshaw, 2014).

Apart from these, it is emphasized that smellscape should be considered within the physical and social contexts of places (Classen, Howes & Synnott, 1994; Henshaw, 2014; Porteous, 1985). Selections of fragrant plants and water features need to consider local cultures and activities as well as wider environmental factors such as temperature and seasonal changes. This presents a challenge

for designing an urban smellscape suitable for all seasons and a wide group of users in multicultural cities. In some countries, smells are highly appreciated and generally accepted in public spaces, such as Japan, while countries such as the US have been identified as generally against scenting in all types of public spaces (Damian & Damian, 2006). However, implementing large-scale fragrant planting in urban spaces carries the risk of causing difficulties for people who are allergic to certain vegetation smells and suffer from hay fever. Water features on a large scale in urban spaces may also be problematic for cities with cold winters.

It is important to define scales and types of spaces when designing urban smellscapes. Generally, they can be designed and studied at three scales (Henshaw, 2014):

1. micro level – a specific site-based scale;
2. midi level – neighborhood district;
3. macro level – citywide area.

Different characteristics and scales of spaces may result in intensity differences of smells and involve different interactions between people and environments. The following section discusses four cases selected using fragrant plants and running water features in urban landscape designs in China, the UK and across Europe.

Cases for Learning

In this section, the cases explore the design of smellscapes by examining fragrant plants and waterscapes at different scales, and with different purposes and elements. Generally, three types of spaces are included: streets, gardens and squares. Chuncheng Road, Kunming is selected for its multi-purpose urban street form and various types of fragrant plants, informing smellscape designs at a midi-level scale, whereas the case in Athens illustrates a much smaller and simpler streetscape, forming a distinct smellscape through interactions of both smells and taste at a micro level. A sensory garden in Sheffield, UK is used to illustrate how community entertainment and educational design purposes can be designed at the macro level, taking into account accessibility and surroundings. The case of waterscapes along the Gold Route in Sheffield is used to show how different types and scales of water features form smellscapes in urban spaces through micro level interactions with people. The Alhambra Palace in Granada provides a good overall example of combining fragrant plants and waterscapes in a sustainable fashion. Each case illustrates strategies and methods of designing smellscapes by using fragrant plants and waterscapes.

Street Plants on Chuncheng Road in Kunming, China

Kunming is located in the southwest of China, which is famous for its rich natural resources and mild climate. The urban area of Kunming city has much greenery and a tradition of landscape design that takes into account the local climate and plant species. Following the local government's intention of making the city green and aromatic, most of the trees selected for the city's landscape blossom and produce aromas delivering visual pleasure, reducing air pollution and providing attractive aromas and shade to residents and visitors during all seasons (Chen, 2005). These strategies have created in Kunming a particular identity derived from the vegetation smells and colors.

A clear example is Chuncheng Road, which provides a good case to learn how fragrant trees and plants can be used in urban districts to achieve an appropriate and satisfying smellscape. Chuncheng Road is one of the major roads in Kunming, with a two-way four-lane motorway, a bike lane and a sidewalk on each side (see Figure 8.1).



FIGURE 8.1 Fragrant trees and plants in summer on Chuncheng Road, Kunming, Yunnan, China.

Image: author's own, 2015.

Trees and plants are used as barriers to separate motorway, bike lane and sidewalk. Most are local fragrant species commonly used in urban spaces, where they can help clean the air by reducing dust and absorbing pollution. The trees and plants are mostly evergreen species, and blossom from February to November, with enjoyable scents. From a smellscape design perspective, in the case of Chuncheng Road, fragrant trees and plants are used in three ways to improve the smellscape: to separate car fumes, to dilute car fumes and to mask car fumes with floral scents (see Figure 8.2).

Bushes planted at about 1 m height help to block particles, car fumes and heat at low levels, improving the pedestrian environment and allowing visual interaction across the road. These

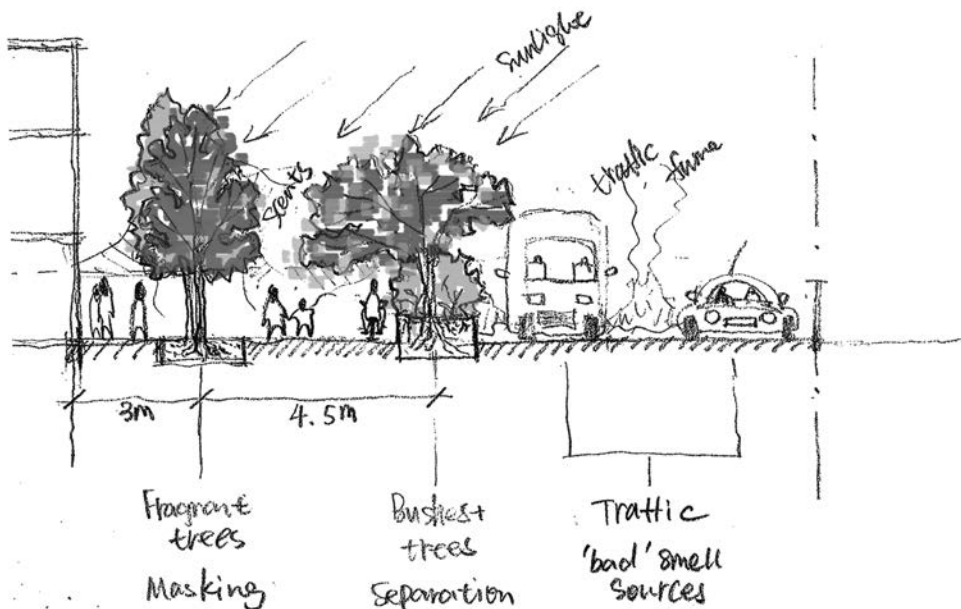


FIGURE 8.2 Interpretation of the smellscape on Chuncheng Road, Kunming, China.

Image: author's own, 2015.

bushes are mainly *Ligustrum quihoui* (waxyleaf privet) and *Gardenia jasminoides* (gardenia), which are evergreen species and effectively reduce pollution of particulates such as sulfur dioxide and hydrogen fluoride. *Ligustrum quihoui* blossoms between July and August, and *Gardenia jasminoides* between May and July, both having white flowers with noticeable light scents, which can be enjoyed by cyclists and pedestrians. Other planted bushes include *Dendranthema indicum* (Indian chrysanthemum), which produces yellow flowers and a light scent from July to November. Above the bushes are trees, mostly cherry blossom trees and *Lagerstroemia indica* (crepe-myrtle); these are also planted with the intention of reducing the effects of harmful gases whilst also providing visual interest through their blossoms (Chen, 2005). Cherry tree blossoms of white and pale pink emerge between February and April, whilst *Lagerstroemia indica*'s bright pink flowers occur between July and September. Their flowers give off light but distinct scents which do not overwhelm the street smellscape. They have wide treetops, providing shade to the sidewalk, and also reducing temperature and the dispersion of traffic fumes across the bushes.

There are three main species of evergreen trees planted near to pedestrian pavements: *Osmanthus fragrans* (sweet olive), *Magnolia grandiflora* (laurel magnolia) and *Cinnamomum camphora* (camphor laurel). *Osmanthus fragrans* blossoms between August and October, with small white flowers with strong, pleasing scents, perceptible from long distances. *Magnolia grandiflora* produces noticeable white flowers from May to July, creating a light, pleasing scent. Both these species are planted every 5 m at the edge of the pedestrian pavement, connecting to the pavement and providing intense smells for pedestrians. By contrast, *Cinnamomum camphora* trees are usually planted non-continuously along the sidewalks, producing a light, fresh scent that keeps insects and mosquitoes away from pedestrians.

It can be concluded from this case that designing the urban smellscape with fragrant plants requires designers to undertake a preliminary study of local plant species, their growing conditions, scents, functions and blossom periods. A key priority in this location is to reduce pollution, with planting explicitly aimed at creating a higher-quality pedestrian environment. The plants selected may absorb harmful gases and reduce dust as well as producing pleasing scents. The selection of fragrant plants may also help to create combinations of different scents at the same time, such as *Osmanthus fragrans*, roses and lavenders. However, it may be more positive to have one distinguishable and dominant smell for pedestrians, to mask traffic, residential and sanitary smells, which also can easily be remembered and become a smell mark. The scale of planting should be carefully considered and tested to avoid being intrusive and allow enough lighting and visual interactions in the space. Another important aspect is to select species conducive to the human scale. For example, in this case, tree trunks are around 2–2.5 m high, which shortens the distances between perceivers and smells coming from leaves, flowers and fruits. Meanwhile, the color and shape of flowers and leaves offers better visual experiences, which may also indirectly add value to the general smellscape.

Bitter Orange Trees in Central Athens, Greece

I am in Athens this spring and the city is drowning in the fragrance of the bitter orange trees that flood its sidewalks. The aroma is intoxicating, numbing the mind and the body's senses.

Frangouli-Argyris, 2013

This section describes the particular landscape in the streets of Athens, with bitter orange trees (*Citrus aurantium*, or Seville orange) yielding scent for pedestrians (see Figure 8.3). These trees and their smells have become a defining feature for the city, certainly in the mind of this writer. Bitter orange is an evergreen species, which blossoms between April and May, with fruits harvested



FIGURE 8.3 Bitter orange trees in a neighborhood in summer, Central Athens, Greece.

Image: author's own, 2015.

between October and December. From late spring to winter, the bitter orange trees give sweet and fresh scents to the streets in central Athens. The wide-scale planting of bitter orange trees was initially for decoration (Varivaki, 2013), but gradually became part of the heritage of the city.

Bitter oranges are too sour to eat raw; however, local people use them in cooking and desserts. Historically, the harvest of bitter oranges was a chance for the local community to celebrate, but this tradition has died out and bitter oranges are now left unpicked throughout central Athens, forming a particular identity of the city. Tourists, who often have no idea that these are *bitter* oranges, frequently touch and taste them, potentially forming attachments between people and these trees based on the senses of smell and taste. Bitter oranges in this case give sensory meaning to the city, both historically and now.

In terms of designing smellscape, it can be inferred from this case that the scale of street and human activities are important. The old streets in Athens are normally about 8 m wide, with pedestrian pavements 1.5 m wide, and with multi-story buildings on both sides (Figure 8.4). The street space is relatively small compared to contemporary building scales, which prevents significant dispersion of the smell from the bitter orange trees and concentrates its intensity. As they are planted in a confined streetscape, mobility remains a priority, which limits the design of planting involving human interactions. The bitter orange trees, as fruit trees, differ from regular fragrant trees and plants by involving the sense of taste as well as smell and vision. The bright color of the oranges hanging on the trees attracts pedestrians' attention, inviting people to smell and taste. This interaction, from seeing to thinking to smelling and eating, makes the smellscape in the street more active and interesting. Meanwhile, the light, fresh smell given by the bitter orange trees is pleasing at a background level, and free of pollen.

Fragrant Plants Applied in Community Space: Millhouses Sensory Garden, Sheffield, UK

A sensory garden has been designed and built by Sheffield City Council to provide a sensory experience of smells and sounds to local residents in this northern UK city (see Figure 8.5). It is located in the Millhouses Park, around 15 minutes by bus from the city center. Millhouses Park provides facilities for children, outdoor activities and sports, with a pond and playground. The

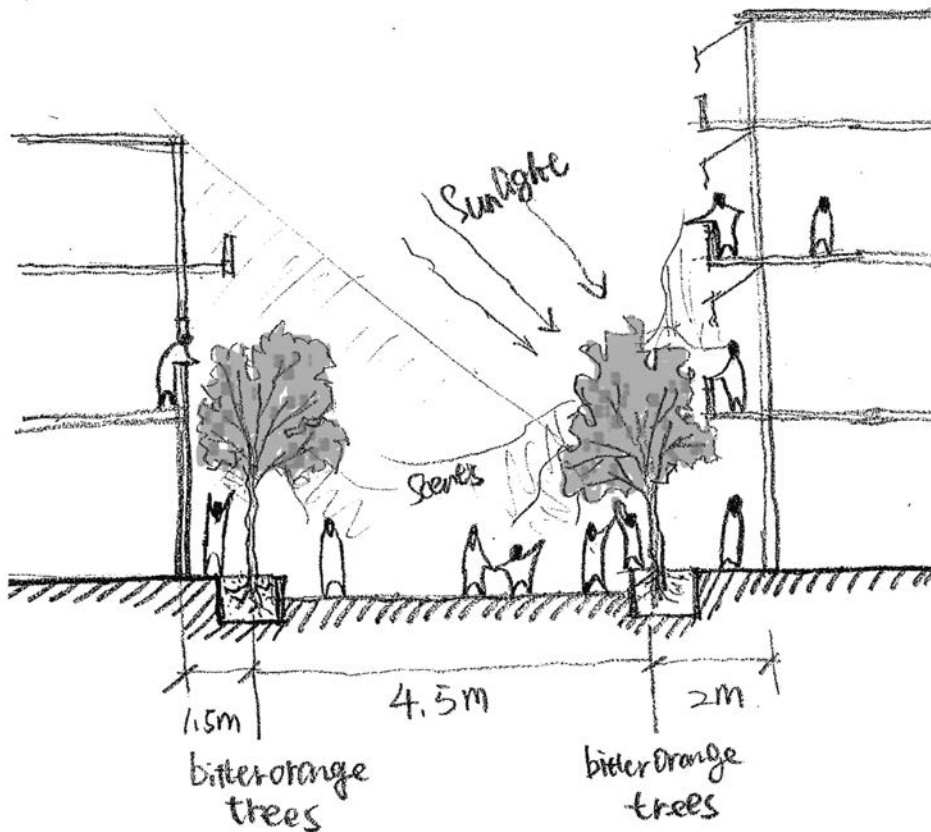


FIGURE 8.4 Interpretation of smellscape with bitter orange trees in Athens, Greece.

Image: author's own, 2015.

Millhouses Sensory Garden is between the tennis courts and a cricket pitch. Access into the garden is from both sides. There is an information board at the front entrance, saying:

This tranquil garden is an area for contemplation and peace. Respond with your different senses to the lovely sounds, smell and feel of the garden. It provides an opportunity to watch and enjoy birds, bees, moths and butterflies. Smell the herbs and flowers which have been specially chosen for their fragrance . . .

On the information board, there are pictures with short descriptions of selected herbs, including mint, oregano, basil, lemon balm, parsley, rosemary, thyme, sage, chamomile and lavender. These herbs are common cooking ingredients in the UK, and familiar to most visitors to the Sensory Garden. However, people normally take the experiences of smells for granted, and pay little attention to the smell environment (Henshaw, 2014). In this respect, the information board at the entrance to the Sensory Garden is particularly useful to make people aware of the distinct smell environment it offers.

The design aims to attract visitors by dispersing smells across quite large distances. Approaching the garden, the bright colors of various herbs stand out, and are designed to lead people in (see Figure 8.5). The core part of the garden is a semi-open space, surrounded by bushes and trees.



FIGURE 8.5 The Sensory Garden in summer, Millhouses Park, Sheffield, UK.

Image: author's own, 2015.

Roses have been planted to create an occasional strong aroma. In the center, a 1 m-high flowerbed with tall rose bushes in the middle emits intense fragrant smells. Two benches are placed facing towards the rose bushes, surrounded by herbs (Figure 8.6). The distance between the bench and the flowerbed is about 2.5 m, allowing a full view of the garden and, in summer, a scent of roses.

The garden is frequently used by residents of all ages and backgrounds, including young parents with babies, older people in wheelchairs, children, young couples and individuals who visit the garden on their way to other places in the park. The location of the garden allows good access, and its small scale enables people with little time to pass quickly through. Meanwhile, the garden has no physical boundaries, and the height of the outlying bushes and trees does not exceed the human scale, allowing people to see through the garden from outside and giving a more open feeling.

Waterscapes in the City Center: The Gold Route, Sheffield, UK

The Gold Route is a path designed to connect public spaces in the city center of Sheffield, from the railway station to Sheffield University, using a series of waterscapes along the route. These vary from silent streams to falling waters (see Figure 8.7). They are embedded in public squares, and attached to different functional spaces, such as the railway station, a university library, art gallery, shops and restaurants. These waterscapes provide multisensory experiences to visitors, particularly in terms of their soundscapes (Kang, 2012). The fresh smell and cooling feel from running water are also often described and enjoyed by visitors:

I can see the water and it smells more fresh. Sometimes you can smell the chlorine in it. I quite like the smell, I find it quite fresh, to be fair, it is a clean smell. It is quite pleasant. I also like the sounds of the running water, I like to look at the running water, they have

different types of fountain in there, it is quite pleasing. If it is good weather, I would probably sit by the water with a coffee, reading, or people watching and time watching. It is a very relaxed environment.

a visitor at Sheaf Square

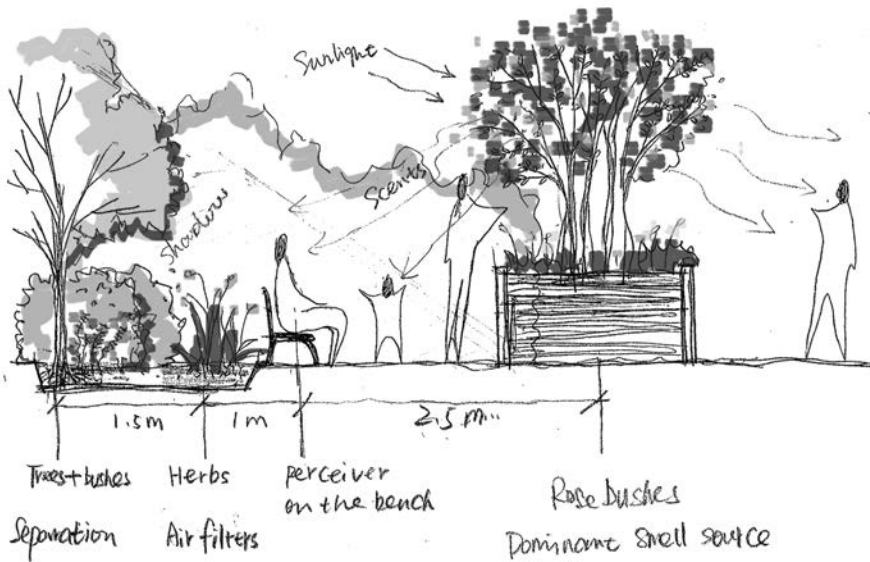


FIGURE 8.6 Interpretation of smellscape in the Sensory Garden, Sheffield, UK.

Image: author's own, 2015.

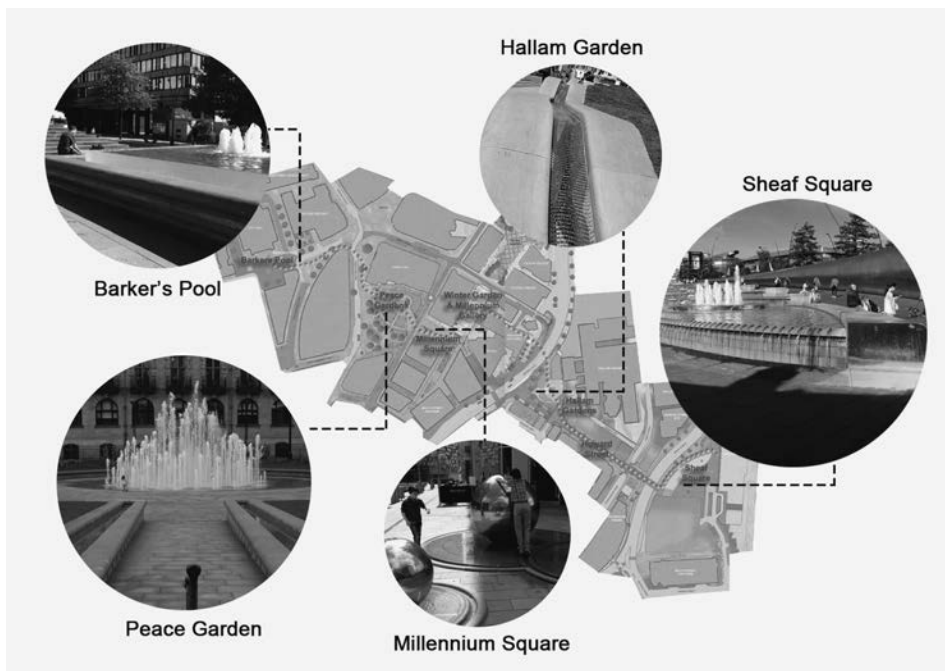


FIGURE 8.7 Waterscapes along the Gold Route, Sheffield, UK.

Image: author's own, 2015.

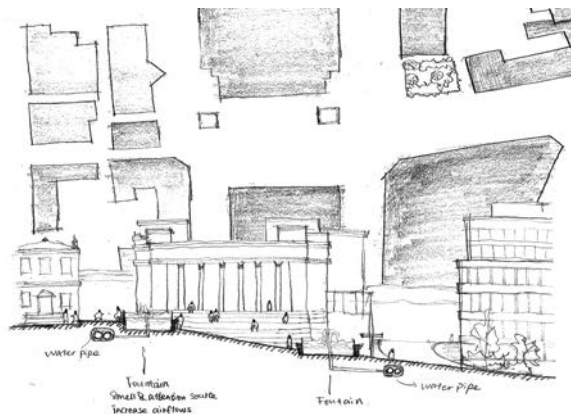


FIGURE 8.8 Urban context around Barker's Pool fountains.

Image: author's own, 2015.

Smellscape along the Gold Route present a fresh and pleasing character to visitors. In the case of Sheaf Square and the Peace Gardens, there is high flow of traffic on one side of the space, producing fumes and noise. Waterscapes in both squares include large-scale running water, accelerating ventilation and removing and diluting traffic fumes. The running water helps clean the air and increases humidity, which offers a fresh smell to mask traffic fumes. Meanwhile, the sounds of running water also help mask traffic noise around these two squares, reducing general sensory nuisance. However, in the case of Millennium Square and Hallam Gardens, both pedestrian areas, the type of waterscape produces no splashes or sounds. They provide sensory experiences by attracting people to get close and play with the water (see Figure 8.7). People touch and smell the waterscape directly, and are distracted from bad smells in the environment, leading to an indirect improvement in people's perceptions of the city.

In Barker's Pool Square, there are two modern fountains built to reflect the historical meaning of the place, which used supply drinking water to the city. The urban fabric around Barker's Pool is quite different from the other four waterscapes (see Figure 8.8). The square is surrounded by multi-story buildings and connected to streets on four sides, with a wide opening towards Fargate, the main shopping street in the city center. Running water increases the ventilation around the square and forms wind corridors through the surrounding road and path network, providing a continuous refreshing effect for visitors.

Waterscape and Fragrant Plants: The Alhambra Palace, Granada, Spain

The Alhambra Palace is located in Granada, and was built by the last Muslim empire in Spain. It is famous not only because of its architectural beauty, but also because of its gardens, which combine fragrant planting with water features, creating a pleasant environment in hot weather. Though smell may not be the main reason for people to visit the Alhambra Palace, for many people it provides strong memories. The gardens also follow a long tradition in Islamic culture of including waterscape for aesthetic and agricultural purposes (Ansari, 2011). The smellscape is enhanced through reflected water increasing the surface temperature of the plants, which helps to accelerate the transmission of aromas (see Figure 8.9), whilst the high humidity caused by the water also improves perception of smells in the garden. The contrast to the surrounding buildings also enhances the general experience in the Alhambra Palace.

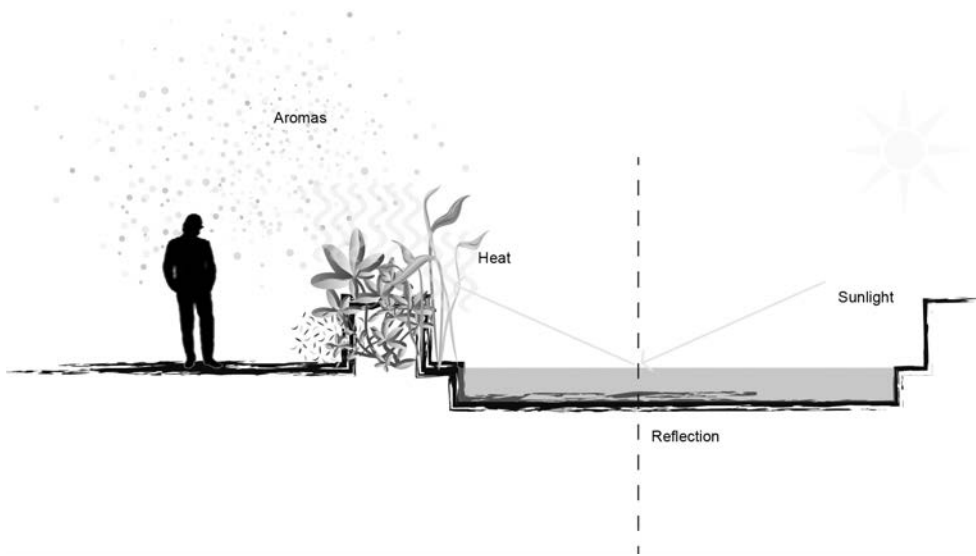


FIGURE 8.9 Interpretation of smellscape in the Alhambra Palace.

Image: author's own, 2015.

Advice for Designing with Fragrant Plants and Waterscapes

Select Appropriate Types of Fragrant Plants and Waterscapes

As Henshaw (2014) suggested, the initial step in the design process of a smellscape is to establish a clear objective. The four cases included in this chapter indicate general aims and relate planting to problem-solving, recreation and education. For example, the Chuncheng Road case particularly indicates how bringing fragrant plants into the urban environment may mitigate the effects of traffic pollution and noise whilst creating character and urban identity. The case of the Millhouses Sensory Garden provides a good example of designing for educational and recreational purposes. There are also places where fragrant plants and waterscapes have become part of a heritage that needs to be preserved to maintain historical smellscapes, as in the Alhambra Palace. However, selection of plants and types of waterscapes needs to be defined within local contexts and established objectives. A strong understanding and exploration of local fragrant plants, types of waterscapes and climate are a necessary prerequisite to designing smellscapes with these elements.

Design at a Human Scale: Distance + Intensity + Boundaries

Smells, which disperse and transmit with air movements, are temporary and unstable in an open urban environment (Henshaw, 2014). When designing urban smellscapes, the intensity of smells needs to be controlled above the threshold level for them to be detected and perceived. As suggested by the cases above, different types of boundaries are important in creating semi-closed spaces, which separate smells and concentrate scents. Fragrant plants and waterscapes can both serve as smell sources and act as boundaries, as shown in Chuncheng Road and Sheaf Square.

Distances between perceivers and smell sources also influence their detection. In theory, the closer the source, the stronger the smell. In the case of fragrant plants and waterscapes as smell sources, the scale of the space will determine distances and potential interactions. These interactions,

like playing with water and picking oranges, also reduce the distance between these elements and perceivers. In a complex urban environment, integration of fragrant trees and waterscapes with people and spaces may need to reflect accessibility to these elements and an appropriate human scale.

Design with Activities + Other Sensory Stimuli + Context

Fragrant plants and waterscapes involve sensory perceptions other than just smell. Vision, sound and taste should be considered in smellscape design, making it essential to identify the characteristics of plants and water which imply other sensory features such as the sounds of running water, the taste of fruit and the color of flowers. Meanwhile, it is necessary to consider how people associate with these elements, like playing with water and cooking with oranges. Therefore, the introduction of fragrant plants and waterscapes into public spaces, as elements of designing smellscape, can be more easily accepted and enjoyed by local communities. For instance, in the Chuncheng Road case, the plants selected are local species, which are familiar to local residents from history. Designers should engage with local residents to understand their preferences not only for an aesthetic, but also an 'aromatic' identity to a place. In many countries, like India, Malaysia, Iran and Mexico, where fragrant plants have been part of culture and life, promoting fragrant plants in public spaces can be a symbolic and natural feature, such as spice markets in Mumbai. Similarly, cities like Venice and Barcelona have smells associated with water and sea wrapped up with their branding. People interact with water through boating, swimming and surfing, bringing with them general sensory experiences, including smells. However, the feature of 'watery' space also needs to be designed within its local context.

Challenges: Seasonal Changes and Sustainability

Seasonal changes are essential issues to consider when designing with fragrant plants. In the cases outlined above, evergreen plant species seem preferable as they provide greenery throughout the year. Plants are selected with different blossom periods and scents. In places, where the climate is mild throughout the year, the influence of seasonal changes can be very small. The challenge of designing smellscape with fragrant plants is to create smellscape that respond to seasonal changes. However, in places where weather contrasts between seasons are large, it is a significant challenge for plants to produce fragrance throughout the year. It is similar in designing with waterscapes, which can be problematic in winter and rainy weather. Meanwhile, the artificial waterscape needs to consider the sustainability of piped water and recycling systems in areas with low rainfall and hot climates. It may be possible to learn from the Alhambra Palace, where water circulates in a sustainable way and contributes to the irrigation of surrounding plants. However, it can also be a major challenge to design such an eco-system with both plants and water within urban contexts.

References

- Ansari, N. (2011). *The Islamic garden*. Ahmedabad: CEPT University.
- Booth, N. K. (1989). *Basic elements of landscape architectural design*. Long Grove, IL: Waveland Press.
- Bringslimark, T., Hartig, T., & Patil, G. G. (2009). The psychological benefits of indoor plants: A critical review of the experimental literature. *Journal of Environmental Psychology*, 29(4), 422–433.
- Buchbauer, G., Jirovetz, L., & Jäger, W. (1991). Aromatherapy: Evidence for sedative effects of the essential oil of lavender after inhalation. *Zeitschrift für Naturforschung C*, 46(11–12), 1067–1072.
- Chen, C., Chen, L., & Yin, L. (2007). Application of healthful plants in the garden. *Jiangxi Forestry Science and Technology*, 2, 58–60.

- Chen, D., Xian, Y., Ma, L., Zhang, Y., Xiao, C., & Ye, L. (2013). Species and application of ornamental aromatic plants in rehabilitation and reconstruction of Wenchuan seismic disastrous area: with Beichuan as an example. *Journal of Guangdong Landscape Architecture*, 35(6), 69–74.
- Chen, X. (2005). Tree species selections for urban greenery in Kunming City. *Forest Inventory and Planning*, 30(5), 104–107.
- Classen, C. (2013). Green pleasures. In B. L. Ong (Ed.), *Beyond environmental comfort* (pp. 175–183). London: Routledge.
- Classen, C., Howes, D., & Synnott, A. (1994). *Aroma: The cultural history of smell*. London: Routledge.
- Cooke, B., & Ernst, E. (2000). Aromatherapy: A systematic review. *British Journal of General Practice*, 50(455), 493–496.
- Damian, P., & Damian, K. (2006). Environmental fragrancing. In J. Drobnick (Ed.), *The smell culture reader* (pp. 148–160). Oxford: Berg.
- Diego, M. A., Jones, N. A., Field, T., Hernandez-Reif, M., Schanberg, S., Kuhn, C. . . . & Galamaga, R. (1998). Aromatherapy positively affects mood, EEG patterns of alertness and math computations. *International Journal of Neuroscience*, 96(3–4), 217–224.
- Elings, M. (2006). People–plant interaction: The physiological, psychological and sociological effects of plants on people. In J. Hassink & M. V. Dijk (Eds.), *Farming for health* (pp. 43–55). Amsterdam: Springer Netherlands.
- Frangouli-Argyris, J. (2013, June 23). Athens, the city of bitter orange trees [Blog post]. Retrieved March 1, 2017 from www.huffingtonpost.com/justine-frangouliargyris/athens-the-city-of-the-bi_b_7128710.html
- Gu, Y., & Zhang, X. (2010). Application of fragrant plants in urban gardens. *Journal of Beijing Landscape Architecture*, 4, 37–40.
- Henshaw, V. (2014). *Urban smellscapes: Understanding and designing city smell environments*. New York: Routledge.
- Kang, J. (2012). On the diversity of urban waterscape. Paper presented at *Acoustics 2012*, April, Nantes, France.
- Liu, Z. (2005). The application of therapy by means of aromatics to gardens. *Forest Inventory and Planning*, 30(6), 91–93.
- Moncrieff, R. W. (1966). *Odour preferences*. London: Leonard Hill.
- Porteous, J. D. (1985). Smellscape. *Progress in Human Geography*, 9(3), 356–378.
- Tuan, Y.-F. (1979). *Space and place: Humanistic perspectives*. Berlin: Springer.
- Varivaki, M. (2013, July 30). *Bitter orange* [Blog post]. Retrieved March 1, 2017 from www.organicallycooked.com/2013/07/bitter-orange.html