

INVISIBLE ARCHITECTURE

The experience of place through smell

Anna Barbara and Anthony Perliss



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INVISIBLE ARCHITECTURE

The experience of place through smell



Anna Barbara and Anthony Perliss

D.I. **FrancoAngeli** 
DESIGN INTERNATIONAL

To Margherita and Rocco

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Olfactive Design. The birth of a discipline

Several decades have now passed since the publication of the book *Invisible Architecture – The Experience of Place through Smell*. What once seemed a field of research somewhat neglected by architecture and design, has over time become an emerging discipline and an increasingly promising professional practice.

In the years since the first edition, I have continued my research around the world, trying to understand who was working with air, as well as who was experimenting with smell in relation to design. Over the last 20 years, various paths of research dedicated to olfaction have emerged in design, products and services as well as in neuroscience to investigate the impact of odors on our brains; in behavioral psychology with applications in marketing, sales, experience; in chemistry and engineering of new products and materials; in mechanics for the design of small technologies and for diffusion both in the environment and the body; in therapies for health and care; in digital systems to convert material into immaterial. (Milotic, 2003), (Henshaw, McLean, Medway, Perkins, Warnby, 2018)

What used to be niche research has become a growing sector both in terms of quantity and quality.

The sense of smell is the only sense we cannot turn off: we can close our eyes, plug our ears, not touch, refuse food, but we cannot stop breathing. (Levi, 2012)

It is the brother of breath, as recited by the protagonist of Patrick Süskind's *The Perfume*. With air, smell penetrates our bodies, and we cannot resist it. Odors thus become vehicle for emotions, memories, illnesses, as well as desires. The dominance of odors is linked to the control of people and their emotions, which is why interest in this organ and its potential is still partly to be explored. (Nestor, 2020)

All our senses respond to external stimuli, but only the sense of smell requires the input of world particles into our body. (Gorman, 1964) (Fuso, 2022)

The involuntary, internalized nature of smell is part of those qualities that make it intangible, profound, and intimate. (Levi, 2012)

In this sense, the pandemic has helped increase awareness on the existential role of this sense, not only on an aesthetic level, but also on a vital one.

Scientific literature shows that there are areas, such as marketing and neuromarketing, which are extremely interested in olfaction and aim at exploring its impact on consumer behavior. Olfaction is also key in immersive experiences frequently linked to museums as well as in retail to understand its contribution to physical experiences in highly digital and/or immaterial contexts. (Ischer, Baron, Mermoud, Cayeux, Porcherot, Sander, Delplanque, 2012), (Lupton, Lipps, 2018)

Olfaction in workplaces, healthcare, retail

The digital revolution we are experiencing makes this immaterial and immanent sense a cardinal tool of presence, through the physical experience of the places that house, even when they're digital, our bodies. For any experience, even the most virtual one, provokes emotions that affect our bodies. There are no places without smells, but there are places where the threshold is so thin that it is not perceived, or others where the smell or the sum of smells constitute an olfactory landscape. The question is whether the sum of the odors produces a cacophony or whether someone has designed the olfactory bouquet and the various odors compose a pleasant or disgusting result.

An olfactory education not only increases sensitivity, but also becomes an indispensable tool for designers to ensure that the invisible qualities of space are consistent with those of the other senses and are not out-of-control or even adverse variables.

The next generation of designers will have to acquire the sensitivity that Joseph Rykwert demanded of his students so that it is indisputable that designing a place does not only mean designing its image, exciting the sight, but also involving all the senses, which are the fundamental media for the experience of a place to be memorable, exciting, and necessarily coherent.

The digital revolution, which has realized some of mankind's primary desires, such as dematerialization, eternity, ubiquity, has found in the sense of smell its biggest ally and most performative sense.

Andy Warhol wrote in 1975 in *From A to B and Back Again* that smell is really a means of transport, more so than sight and hearing, touch, and taste. It is the sense of smell that is the powerful medium in taking us elsewhere. Smells make us travel through time and space but also simultaneously here and there. (Warhol, 1979)

The sense of smell is often wrongly associated only with the luxury sector or with wellness and hospitality, but its effects are instead much broader and deeper, impacting and altering our psychology, our mental and emotional state, and our physiological condition. (Morrin, Ratneshwar, 2000)

Neuroscience is extensively investigating how olfaction inhibits or accelerates certain mental states or physical and physiological processes. New explorations are helping to discover how many of our behaviors are often reactions to olfactory stimuli. (Ruzzon, 2022) (Bitner, 1992) (Barwich, 2020)

The impact of olfactory stimulation is a performance enhancer in the areas of productivity, learning and concentration. That odors influence mood is a well-known fact, but scientific literature shows that they also influence job performance and behavior. Research data on workplaces shows that scented environments with diffusers reduce staff absenteeism and that well-oxygenated and ventilated offices increase productivity and cognitive functions by more than 60 per cent compared to the average. This is why the design of workplaces is strongly involved in this topic, both in introducing materials with olfactory characteristics, as well as in the design of ventilation systems that contemplate the possibility of acting not only on air, temperature, pressure and humidity, but also on fragrance. (Baron, 1990)

The results of research and experiments have made it clear that the impact of odors on our organism, on an emotional and behavioral level, can influence therapeutic aspects and reconfigure places of care, through olfactory design that, in certain spaces and at certain times, assists the cure itself.

All air qualities – smell, temperature, humidity, pressure – become therapeutic tools with which body and psyche can be healed.

The potential of the sense of smell in the treatment of certain senile diseases, from dementia to Alzheimer's, has been tested and measured. Olfactory disorders are usually detected in 85-90% of patients already in the early stages and worsen as the disease progresses. However, only 6% complain about this sense loss. Although in Alzheimer's patients olfactory disturbances are due to both peripheral and central deficiencies – with loss of the ability to detect, recognise, identify, remember – the ability to make

qualitative judgements of odors such as intensity, hedonism, familiarity, edibility, etc. still remains. (Brand, 2019)

In recent years I have developed – alongside Francesca Ripamonti – an Olfactorium project, in Il Paese Ritrovato, a small village for Alzheimer's patients in Monza, where the inhabitants practice olfactory gymnastics to slow down the degeneration of the disease. This project stemmed from the scientific evidence that Alzheimer's patients gradually lose their sense of smell and consequently the cognitive relationship between smells and memory, but it wanted to test what the scientific literature of recent years has shown instead, namely that the loss of cognitive memory is not accompanied by an equal loss of emotional memory. (Albrecht, Schreder, Kleemann, Schöpf, Kopietz, Anzinger, Demmel, Linn, Kettenmann, Wiesmann, 2009)

Research carried out by the Alzheimer's Society shows that patients react to certain odors, such as cinnamon, with a significant increase in certain cognitive functions, such as visual-motor responses, working memory and the attention threshold. Olfactory stimulation, which can evoke pleasant memories in the elderly, induces greater sociability and a desire to get out of the house and establish relationships, leaving behind the isolation that is often the cause of depression. Some fragrances are capable of transporting people back in space and time, and therefore their inclusion in retirement homes, or homes for the elderly, can be of great help to their sociability. (Ansari, Johnson, 1975)

The Olfactorium was therefore an olfactory gymnasium to exercise patients' emotional memory and stimulate sociality and vitality.

In addition to the research interest in the health and care area, a significant part of the research was directed towards the commercial area, driven by marketing rather than interior design.

The emotional relationship between smell and emotional memory has been a privileged territory of experimentation in retail, hospitality, fashion, food, sports, cosmetics, entertainment, tourism and all the imagery that experience design is able to generate. (Spangenburg, Crowley, Henderson, 1996)

Early studies, carried out as early as the 1990s, looked at the psychological reaction of consumers in shops that featured fragrances. (Gulas, Bloch, 1990)

Every year, exorbitant sums are spent on incorporating eye-catching lighting, sound carpets, furnishings, and equipment in shops to create atmospheres to increase sales or make the experience memorable. (Bouzaabia, 2014)

Generally, the research has focused on localised odors (Gulas, Bloch, 1990), or on scented objects for promotional purposes (Morrin, Ratneshwar, 2000) and only in isolated cases has it focused on olfactory studies of spaces by testing the behavior within certain simulated environments. (Spangenburg, Crowley, Henderson, 1996).

Designing for the sense of smell in spaces means dealing with ambient scent, i.e. air, breathing, temperature, humidity, materials, orientation, scent and not specifically with the smell emanating from a particular object. (Morrin, Ratneshwar, 2000) (Zemke, Shoemaker, 2007).

Experiments on ambient scent show that consumer evaluations are better when the environment is scented than when there is no scent and that a scented environment always has a positive effect on behavior and evaluations. (Baron, 1997), (Chebat, Michon, 2003)

Incorporating smells into retail outlets, shops, gyms, as well as linking smells to travel and experiences is a lucrative market. Those who design spas, cruise ships, large hotels know the persuasive and attractive power of olfaction within hospitality experiences. (Shoemaker, Lewis, 1999).

The olfactory brand also concerns the designer of spaces who must design and govern this experience, create real emotional landscapes that are memorable, without being toxic and invasive. (Bone, Jantranis, 1992)

Other studies show that a design of environmental stimuli that focuses on the coherence between smell and sound produces greater satisfaction with the experience and makes consumers' decision-making processes more efficient. (Mattila, Wirtz, 2001), (Mitchell, Kahn, Knasko, 1995)

Research testing the effects of environmental odors on brand evaluation and recall shows that odor consistency has a relationship with brand memory. The presence of odors in the brand evaluation phase results in participants' increased attention to brand stimuli, increased brand recall and increased accuracy in brand recognition. (Morrin, Ratneshwar, 2003)

Invisible Architectures

The book is structured around seven major thematic areas, which remain highly topical today because they act as a bridge between smells and places, objects, rituals involving death, the spiritual, bodies, sex, time, identity and authenticity, memory, emotions, rituals, etc. (Chu, Downes, 2002)

The theme of death deals with the inexorable transformations of matter, which, as it transforms, releases into the air the volatile components that we somehow inhale. These transformations, heading inevitably towards death, show a seamless continuum. The polyamines cadaverine

and putrescine, which are crystalline compounds found in decomposing organic matter, belong to the same family as the spermidine and spermine found in semen.

The subject of spirituality and the places associated with it also still finds in the sense of smell one of its most important mediums.

Although rituals are disappearing, the smells of incense and candles remain expedients to lend spirituality to more secular and profane rituals and, on the contrary, the use of scents serves to invent new rituals and other spaces of sacredness. (Han, 2021), (Turley, Milliman, 2000)

Smells are primarily concerned with the identities of places, the authentic and the artificial, to convey emotions and memories. The identity of places, people, animals, materials, is inscribed in smell and that is why it is so powerful and dangerous. The olfactory identity is so memorable that human beings, barring serious pathologies, find it difficult to erase it. In fact, olfactory memory is a more accurate and reliable long-term memory than conscious memory. Whereas visual memory loses more than 50 per cent of its intensity after three months, memories related to the olfactory sphere only lose 20 per cent of their intensity after one year. (Barwich, 2022)

In addition to companies that place an important part of the emotional brand memory in the olfactory experience of their spaces, museums too have in the last decade discovered the identity and narrative nature of odors applicable to exhibitions, installations or works of art. Apart from a few museums internally dedicated to fragrances, such as the Musée du Parfum in Paris (founded in 1983) and the Osmothèque in Versailles (founded in 1990), there is a great exploration of olfaction in art, exhibition and curatorship of important exhibitions. (Nieuwhof, 2014), (Levent, Pascual-Leone, 2014)

In recent years, I have designed several museums in China dedicated to the local liquor, called *baidu*. The first is located in Shaoyang, Xiangjiao Liquor Museum in Hunan, the second Tongwangyao Liquor Museum in Changsha, the third in the Heritage Village of Lidu, Jiangxi Province.

The liquor is produced by fermenting sorghum, which is a strong identity element of this popular drink throughout China. The olfactory identity was indispensable in defining the narrative, display, and experience within the 3 museums. Sorghum scraps were used to make some of the plasters, but special diffusers were also designed for the olfactory tasting of the different states of ageing of the same liquor.

Olfactory identity also means similarity or diversity, it implies proximity or distance, attraction or repulsion, it regulates that social distance

that induces us to buy perfumes to increase the aura of seduction, attraction, or to refresh spaces so that they are more pleasant. (Baron, 1981)

Multiculturalism and discrimination

The issue of multiculturalism, of diversity between peoples, urgently present in today's political debates, also concerns the sense of smell and the proximities between bodies that often smell differently. (Allen, Havlicek, Roberts, 2015)

According to odor-obsessed writer George Orwell, bad smell was an insuperable barrier to the success of socialism. (Sutherland, 2016)

Smell discrimination is also undoubtedly inscribed in the experience of places and relationships. Everyone smells differently, depending on their diet, age, physical activity, health. (Brand, 2019)

The history of spaces and architecture is about the need for human beings to distance themselves from bad smells. (Hamblin, 2020)

It begins with the distinction between human and animal odors, removing the beasts from the houses and confining them to the stables, continuing with the concealment of bodily odors relegated to the bathroom, and continuing with the denial of the smell of food in the kitchen, strategically distant from the reception rooms like in 19th century bourgeois homes. (Muchembled, 2020)

When hominids abandoned their quadrupedal gait in favor of an upright posture, they marked a revolutionary breakthrough in the perception of space through the sense of smell. The nose was no longer close from the ground. Humans stood upright.

Sigmund Freud described the disgust for excrement as the strongest push to move from the quadrupedal position of childhood to the bipedal position of adulthood. The beginning of the industrial age brought an end to the 'excretional age' of architecture, when spaces were cramped and promiscuous with the smells of earth and bodies, of beasts, of sex. (Freud, 1991), (Hamblin, 2020)

The birth of skyscrapers was paradigmatic in its attempt to elevate whiteness and cleanliness beyond hygienic qualities turning them into moral values. The regulation of odors became a means of social and moral control. During the 20th century, spaces were dried out and dehydrated, for fear of tuberculosis and diseases of all kinds. Light and air became rights for all, as the 10th CIAM (International Congress of Modern Architecture, 1953) proclaimed. (Colomina, 2019), (Hamblin, 2020)

In the last twenty years, the topic has become an obsession in some countries such as Japan, where the design and production of deodorants, halitometers and other instruments that can ensure that one's smell will not bother others, is one of the most flourishing markets.

With the pandemic, sensitivity became neurotic, for the obsession was not exclusively against bad smells, but rather against an odorless virus.

Air as a vehicle of contagion takes us back through the centuries, reintroducing protective masks, greater distances between people, less crowded spaces, and more efficient and tightly controlled ventilation systems. (Nestor, 2020)

Although we can recognise more than 10,000 different smells, we are among the animals with the least developed sense of smell and have exercised it less and less over the centuries.

The sense of smell is also connected to materials, for the air we breathe contains VOCs (Volatile Organic Compounds) that are gradually released from most materials used in architecture and design. They are present in buildings, materials, furniture, wood panels, laminates, synthetic fabrics, carpets, upholstery, insulation, polyurethane foams, glues, lacquers, resins and interior cleaning agents. (Henshaw, McLean, Medway, Perkins, Warnby, 2018)

Materials, in turn, react with each other in a kind of composition that blends the intangible qualities of different materials into a single dynamic identity. (Zumthor, 2006)

In a multi-species and digital world, the loss of our sense of smell could lead to our extinction. This is why the pandemic has raised a fundamental question for human existence that digital technologies can help save.

The relationship between virtual, augmented, artificial technologies and the sense of smell is a big gamble. To date, odors have not yet been digitally conveyed, but it is predicted that by 2030 olfaction will play a key role in IoT systems and immersive experiences.

More than half of the world's population lives with little to none contact with nature due to continued urbanisation, which increases the need for natural experiences. Research data shows that 60 per cent of people hope that videos will soon be accompanied by smells as well as sounds, and more than 56 per cent of respondents to this research expect by 2030 to be smelling the smells of the films they are watching. What failed in the 1960s experiments with odoramas during film screenings could now be enabled by technologies. (Ischer, Baron, Mermoud, Cayeux, Porcherot, Sander, Delplanque, 2012)

Will phigital life be odorless or instead more stimulated? What will virtual spaces smell like? What air will there be in the extremely artificial

spaces we will design and live in? What role will Artificial Intelligence play?

There already are some A.I. experiments aimed at recognizing certain chemicals that can alert, modify, and react according to stimuli, just as there are technologies that can monitor what happens in spaces, but also choose the quality of the air we breathe. And there are patents and research on wearable technologies to help enable materials and fabrics around us to react to odors. (Tillotson, 1991)

One of my projects for a residential tower in Xi'an, China in 2018, explored the possibility of customizing the olfactory landscape of each flat depending on the time of day, the tenant's mood and the need to relax or wake up. In this case, both the materials and a home automation system allowed for the management and control of the air and any fragrances.

In a digital world that encourages the separation of perception and emotion, where the present is often a time of images uploading to then be experienced elsewhere, continuing to use the sense of smell may serve to keep the body at the center of the experience of place and the exclusive seat of emotion.

Olfactive Design

The relationship between the sense of smell and many disciplines of design and architecture is nothing new. Odors are found in the materials that build architecture, in the rituals that are hosted, in people's activities, in the people themselves.

When these two buildings, the visible and the invisible, are coherent, they produce pleasure, narrative and comfort; when they are not, the generated effect is one of discomfort, disorientation, and even illness.

We inhale and exhale 25,000 times a day, we let pieces of the world into ourselves: this dimension of the project and the meanings it carries should not be overlooked.

Places have smells, cities have smells. Paul Valéry recounts those of Genoa's *sottoportici*, Alberto Savinio the amiable ones of Venice and a plethora of writers have written about those of Paris, its stinks and its smells. Artist Sissel Tolaas has reproduced the olfactory landscape of 52 cities since 1998. (Henshaw, McLean, Medway, Perkins, Warnby, 2018)

Joseph Rykwert used to say that when one of his students mentioned, for example, types of Greek architecture, he would ask them what the Greeks did in the building: what happened on the altar, for example, where cows, bulls and other animals were sacrificed.

The great masters of architecture designed considering the olfactory matrix of their buildings: Richard Neutra, Alvar Aalto, Peter Zumthor, Herzog and De Meuron, Gigon and Guyer, Diller and Scofidio, Philippe Rahm, to name just a few.

Today, this immaterial and profound dimension must be designed, it can no longer be left only in the hands of the companies holding the keys to our emotions, subliminally ready to guide us only towards their own interests.

We are at the dawn of an important new design discipline, that of olfactory design, which not only takes us into a dimension yet to be partly explored, but which requires new skills, offers new professions and markets. A discipline that requires transversal and vertical skills capable of exploring an aesthetic beyond sight, an ethic beyond consumption, a sustainability of materials, a healthiness of indoor and outdoor air, a knowledge of the neurological and physiological impact of certain substances on our actions and emotional reactions. (Bonnaud, Fraigneau, 2021)

Olfactive Design explores issues related to spaces, products, services, behaviors, experiences, interfaces and air qualities. It is a discipline whose main objective is not merely the scenting of environments, but rather the understanding of the nature of the materials that are chosen to furnish an environment, the movement of air in spaces, as well as their temperature and moisture which are able to convey odors and volatile components.

It is a discipline made up of the merging of several competencies in design, energy, chemistry, mechanics, neuroscience, art, perfumery, history, anthropology, ethnography, marketing, behavioral psychology, etc.

Olfactive Design is about designing a dynamic olfactory composition that can redesign spaces. Designing with the sense of smell means in fact constructing invisible forms of architecture within the visible one. In space, as well as in time, for smells move naturally and artificially and change continuously. It is therefore not a question of choosing a fragrance diffuser, but of choosing the materials to be used in the project also for their olfactory qualities, deciding how to make the air which carries them move, where to put a window or an air vent. It is a question of deciding which odor should trigger the experience and when to start it, and then how it should change over the course of the experience of a place, where it should be saturated and where it should be eliminated to make way for other odors or the absence of them. Entering a place hence becomes the moment in which memory, emotions, and behavior are activated. The lobby, the reception, the waiting room are places where the presence of smell kickstarts the invisible adventure of emotions in space.

Designing spaces with olfaction is like writing a musical score, with pauses, rhythms, volumes, notes. The trivialization proposed by the market to allow the olfactory experience, conveyed by candles, incense, flowers, diffusers, is emancipating itself towards an integrated design, which stems directly from the project itself and is not included at the end as an after-thought decoration. The shift from perfumery and decoration to design has turned this into an area of research and design in the contemporary world, far removed from cosmetics and environmental perfumery, integrated with digital technologies and sensitive to people's physiology.

Olfactive Design offers unlimited opportunities. A design practice that, despite being present all throughout human history, has only today become a cardinal discipline in the experience of places.

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Architects and designers Anna Barbara and Anthony Perliss dig deep into the unexplored, yet profound, relation between place and smell. How does the odour of a space, of a building, influence our perception of it? Moreover, how does said olfactory experience alter our very behaviour and understating of place?

Tracing back the history of smell and architecture throughout cultures and centuries, *Invisible Architecture* is a groundbreaking exploration of the most invisible and overlooked of our senses, and its seemingly infinite applications in the world of design and architecture.

Anna Barbara is Associate Professor in Architecture and Interior Design at Design Department, Politecnico di Milano. President of POLI.design; Member of the Board of Directors of the World Design Organisation; Co-founder of the Global Design Futures Network; Scientific coordinator (with Venere Ferraro) of the D\Tank, Design Department, Politecnico di Milano. Co-director (with Roger Schmid) of the Executive Course in Olfactive Design at POLI.design.

Anthony Perliss, raised in San Francisco, moved to New York City to study creative writing. There he worked in the film and photography industries. He continued his studies in Milan, specializing in sensorial analysis at Università dell'Immagine. He then worked in Paris, translating scent into image for a fragrance house. He has since moved back to California to co-found Perliss Estate Vineyards with his father.