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# Olfactory Attunements and Technologies: Exposing the Affective Economy of Scent

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We conceive olfaction as a sense of the elemental—a term encompassing odors and the organs that detect them. Contributing to efforts in elemental thinking, we enlist olfactory attunement as a sensual and speculative mode of aesthetic orientation, an analytical frame for attending to scented matter(s) in the air. Moving in malodorous urban airs of the American Northeast, we encounter new technologies and techniques for curating scented bodies and micro air spaces, fueled by the secretive Fragrance & Flavor (F&F) industry. The F&F industry is creating and promoting “natural” and “pleasurable” scents and atmospheres that impress and inhabit bodies, creating an affective economy that summons, seduces, and habituates moods and memories. We expose the expressive infrastructure of aesthetic capitalism in the realm of olfaction using examples of new digital technologies in transmitting and exercising personalized proprietary scents: AireSpa®, Cyrano by Vapor Communications, and Aroma Gym™, a smell art installation. Operating beneath the radar but in tandem with wellness and the smell arts, digital scenting technologies are manipulating and, ultimately, diminishing the most primal of our environmental senses. We call for olfactory experiments in the “wildlands” of scent, both fair and foul, arguing that olfactory attunements, as artful science and practice, are imperative for multispecies survival on a damaged planet. **Key Words:** affective economy, attunement, elemental infrastructure, olfaction, tentacular thinking.

## ONLY HUMAN

... the Deluge: a planet completely covered with garbage and billboards, lakes saturated with waste, submarine ditches overflowing with plastics, seas covered with debris, residues, and peelings ... All [other] species have vanished and we remain alone in the world, among ourselves ... There are already islands where the stench announces this ending.

—Michel Serres, *Malfeasance: Appropriation through Pollution?* 2008 [2011], 69–70

The ending is, perhaps, suggested in the isle of stench named Secaucus, New Jersey. In Secaucus, hotel windows that cannot open portend malodorous air outside. Viewed from the confines of a chain hotel room, it is difficult to discern where the New Jersey Meadowlands begin and the oily autescape ends. A pungent, blackened scene unfolds black marsh, black

asphalt, and once-upon-a-time, as the town's Algonquian namesake attests, black snakes.<sup>1</sup> As a largely uncontrolled refuse dump for much of the region, the infamous New Jersey stench purportedly originates here, where the odor of pig farming and other noxious land uses of the past commingle with petroleum refining and Turnpike traffic in the petrochemical present. The only discernible "life" in this fossil fume topography is the snaking tentacles of volatile organic compounds (VOCs): methane, benzene, toluene, waft and swirl skyward.

As if to confirm that the air out-of-doors is indeed toxic, hotel guests are provided AireSpa®, an electronic device located adjacent to the sealed window that, for a fee, affords total atmospheric control. "Air, scent, and sound—your room, your way," asserts the accompanying AireSpa® literature. With just the right amount of water vapor (Electro Sanitized Mist™), particulate matter (HEPA filtration), soundscapes (16 to choose from), and aromatic volatiles ("four nature inspired scents"), a guest might curate an indoor airspace inspired by what the outdoors ostensibly once was. Ironically, the hotel room occupant seeks to supplant the man-made petrochemical stench outdoors with the New Jersey made, synthetic scent of "lavender" indoors. As the "episcenter" of the Delaware River petrochemical corridor and the huge American flavor and fragrance (F&F) industry centered in New Jersey, it seems fitting that consumer atmospheric "choices" are available here. To scent or not to scent the fossil-fumed air? This is the portentous odor of the Anthropocene; not a planet without humans, as many fear, but a planet of only humans, as Serres imagines. Anthropocentrically fouled air outside, man-made synthetically derived fragrances inside, human wastes of all kind; such is the stench of humans and their effluvia.

## THE SCENT TRAIL

We venture from home on the thread of a scent.<sup>2</sup> Passing through the stench of Secaucus, NJ, and the indoor aromatics of AireSpa®, we first pause and gain our bearings in attuning to scent as a primal, elemental sensibility. The scent trail then takes us to New York City, where *Aroma Gym*™ in lower Manhattan beckons, designed as part art installation and part exercise salon at the confluence of olfactory technology and wellness center. We discover that our olfactory workout at *Aroma Gym*™ draws on scent technology developed as prototype for *Cyrano*, the first digital scent player promoted by Harvard Professor David Edwards and his start-up company, Vapor Communications, which we sniff out in Boston. Through these olfactory travels in the Northeast, we expose digital scent technologies as aesthetic surface expressions of a vast elemental infrastructure (McCormack 2016): a massive, yet veiled, affective economy hidden in plain scent beneath our noses. The overarching mission is to attune to olfaction and carry out a critical *elemental exposure* of scent technologies in cultivating moods, minds, and memories. A key argument is that through synthesizing, commercializing, and now digitizing scent, this poorly understood affective economy is curating distilled and diminished noses and olfactory worlds. In the end, the scent trail returns to the stench of Secaucus, NJ, and Serres's troubling imaginary of a polluted only-human world. We close by calling for olfactory experiments in the "wildlands" of scent, both fair and foul, arguing that olfactory attunements as artful science and practice are imperative for multispecies survival on a damaged planet (Tsing et al. 2017).

## ELEMENTAL MATTERS

Contributing to elemental geographies, we enlist olfactory attunement as a sensual and speculative mode of aesthetic orientation, an analytical frame (Dixon, Hawkins, and Straughan 2012; Hawkins and Straughan 2016) for attending to scented matter(s) in the air. Drawing on three overlapping conceptualizations of the elemental outlined by McCormack (2016), we conceive olfaction as a sense of the elemental—a term encompassing odors (scents, volatiles, smells) and the organs that detect them. Consider, firstly, that the classical elements of earth, air, water, and fire, are each comprised of aromatic stuff. “Without volatile compounds, life on earth as we know it would be impossible” (Herrmann 2010, 1). As biotic “infochemicals” odors are an evolutionary and planetary force, sensible in some measure, by all living things, yet fundamentally unknowable to humans and their devices. The noted scientist Thomas (1990, 279) makes a poignant argument for the elementality of odor when he writes, “I should think we might fairly gauge the future of biological science, centuries ahead, by estimating the time it will take to reach a complete, comprehensive understanding of odor. It may not seem a profound enough problem to dominate all the life sciences, but it contains, piece by piece, all the mysteries.”

What does the nose know? Smell is primal; it is the oldest and most direct of the bodily senses. Mammalian evolution is linked directly to smell and the limbic system in the human brain. Even deeper in time, evolution of life on earth is traced to the ability of single-celled organisms to detect chemicals in the air and water through the chemosenses—what humans commonly refer to as smell and taste. (The flavor of food is predominantly generated by retronasal olfaction.) Clumsy sensory categories such as these hardly convey the complex and barely understood affordances of olfaction for humans. Consider that olfactory receptors are located throughout the human body; heart, lungs, kidneys, and sperm can “sniff” and chemically respond to odorants (the latter using smell as a navigational aid in motility). Yet, noses are extraordinary sense organs, uniquely adapted environmental sensors. A direct link between environment and brain takes place through the neuroanatomy of olfaction; volatile or aromatic molecules must make physical contact with one or more of the approximately 400 active receptors lining the ciliated olfactory epithelium inside the human nose—sending a direct chemical signal to the limbic system in the brain, the epicenter of emotion and memory. For this reason, smell is neither the property of aromatic molecules nor the sensing subject; rather, it is the affective event of their biochemical meeting. Moreover, there are no inherently “good” or “bad” odors for humans, only what is learned through sociocultural experience (Wilson and Stevenson 2006). It is this instantaneous neuroanatomical nexus of smell, memory, and emotion—but not the language center of the brain—that quite literally leaves us without words for smell experience, yet always affected.

Secondly, volatile aromatic compounds are elemental in their particular “physico-chemical” properties and capacities to react with other bodies, atmospheres, and life in unique ways. Scents are volatiles, a word originally applied to things that fly, namely birds, and later to light molecules that quickly fly or escape a substance. Unlike helium (McCormack 2015b), volatiles don’t escape earth’s atmosphere; they necessarily trail, eddy, and eventually dissipate near the surface of things, where biological forms of life reside. Odors are, elementally, of the Earth, a sentiment best expressed by Astronaut Chris Hadfield upon return to earth via space capsule: “To smell the trees and the grass and the water felt intoxicating, and I thought to myself, what is

that incredible smell? And that was Earth” (Mindich 2014). Smell, for humans, is a volatile register of emotion and memory, as suggested by Astronaut Hadfield’s nasal nostalgia and the Latin etymology of the word scent (*sentire*) meaning “to feel.” “Feelings,” says Whitehead (1979, 87), “are ‘vectors’ for they feel what is there and transform it into what is here.” The materiality of olfaction pivots on feeling, between the molecular (neurochemical) and the affective (emotions, moods, atmospheres). For these reasons, the elemental properties of olfaction are ripe for capitalist exploitation and resistance.

Thirdly, odor is elemental in the sense of an “environmental milieu within which different forms of life are immersed, enveloped and take shape” (McCormack 2016, 421). Scents are environmental information transmitted atmospherically; shaping and shaped by immersive mediums (air, water, sociality) and differing forms of materiality. In both meteorological and social atmospheres, scents condition (and are conditioned by) air, space, and bodies of all kinds in diverse ways. In atmospheric terms, odors are not formed and transmitted as uniform “clouds”; rather, patterns in movement show intermittency, pockets or regions of high and low signal (Figure 1). The tentacular, serpentine movement of aromatics is indicated by the phrase *scent trail*, an idiom expressing the embodied and spatial dimensions of knotty aromatic intersections. Humans, like other animals, can follow the scent by catching on to the folding and buckling of aromatic tentacles (Porter et al. 2007). Compass-like, aromatic molecules guide and direct organisms of all kinds in zigzagging movements of the body and rapid, two-nostril stereoscopic sniffing to pull a tendril. Despite centuries of believing otherwise (McGann 2017), humans have a really good nose, enhanced through capacities to learn with smell training (Majid et al. 2017).

We maintain that alongside spheres (Sloterdijk 1998 [2011]) and balloons (McCormack 2014), olfaction is an elemental, tentacular modality through which to think and feel atmosphere. Detected aloft, scents often guide and direct bodies downward, toward vital

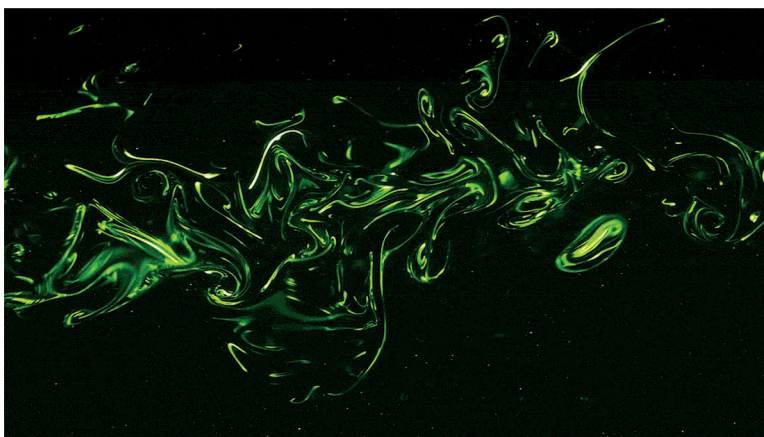


FIGURE 1 Video still of a scent visualization made by the Ecological Fluid Dynamics Lab at the University of Colorado Boulder, led by John Crimaldi and featured in the PBS News Hour article “What a smell looks like” by Akpan and Ehrichs (2016).

environmental and social information on the skin, on the surface of things, on all fours. Olfaction is an airy, yet deeply earthy sense, orienting bodies within environs and micro airspaces: habitats, rooms, surfaces, skin. Organisms guided by aromatic molecules, writes Lingis (2004, 282), “advance into the environment snout first, sniffing, savoring, nibbling their way along.” Smell is the oldest navigational sense in the world, yet it remains poorly charted socially, culturally, and scientifically. Humans with sensitive noses, suggests the olfactory spatial hypothesis, are indeed better navigators (Dahmani et al. 2018), but bacteria, worms, fish, and seabirds were using it long before sailors. “Smell,” writes Thrift (2003, 14), “is an affective shape-shifter ... from one pragmatic orientation to another,” guiding bodies affectively and spatially.

In olfaction, there are no stops. “Tentacularity,” says Haraway, “is about life lived along lines ... not at points, not in spheres” (2016, 36). For life on earth, odorants are an immersive, ambient, and ubiquitous mode of chemical communication detectable by olfactory systems uniquely adapted for continuous monitoring, an observation made by Kaye (2002, 1) in exploring the use of computer-generated scents for information communication.

Ambient media has the property of moving seamlessly from the periphery to the focus of our attention and back again. Scent is arguably the quintessential form of ambient media. It can exist quietly in the background, unnoticed by our conscious mind, but can bring itself to our attention when necessary.

This neuroanatomical modulation between peripheral and centrally focused attention through which olfaction takes place is both a model for networked computing and a signal of sensate vulnerability (Hansen 2012).

These elemental matters form the groundwork and atmospherics for exposing and critiquing new digital scenting devices capitalizing on the aesthetics of scent. The secretive F&F industry—operating beneath the radar but in tandem with wellness and the smell arts—is manipulating and, ultimately, diminishing the most primal of our environmental senses. In the following two sections we expose the expressive infrastructure (Thrift 2012) of aesthetic capitalism in the realm of olfaction. First, we narrate an encounter at the art installation, *Aroma Gym*<sup>TM</sup>, a temporary experience space located in lower Manhattan. We, then, turn to nonrepresentational experimentation with *Cyrano*, the world’s first digital scent player, as “a device for doing atmospheric things” (McCormack 2015a).

## SMELL ART AND DIGITAL SCENTING

We enter *Aroma Gym*<sup>TM</sup>, an art installation (Figure 2) dedicated to “exercising the sense of smell” in response to worsening outdoor air quality and the purported bodily benefits of a strong nose: improved memory, mindfulness, and weight control. Artist/scent DJ Gerard Segovia and master perfumer-inventor-scent composer Christophe Laudamiel conceive *Aroma Gym*<sup>TM</sup> as a restorative space for “working out” the olfactory system (Figure 2A). Housed in a slender, window-lined storefront with small, brushed aluminum devices on display, passersby do a double take, scanning to discern what, exactly, might be on offer (Figure 2B).

Upon entering *Aroma Gym*<sup>TM</sup> written instructions advise an olfactory warm-up: gently inhale purified water vapor streaming from the humidifier to sooth, moisten, and optimize

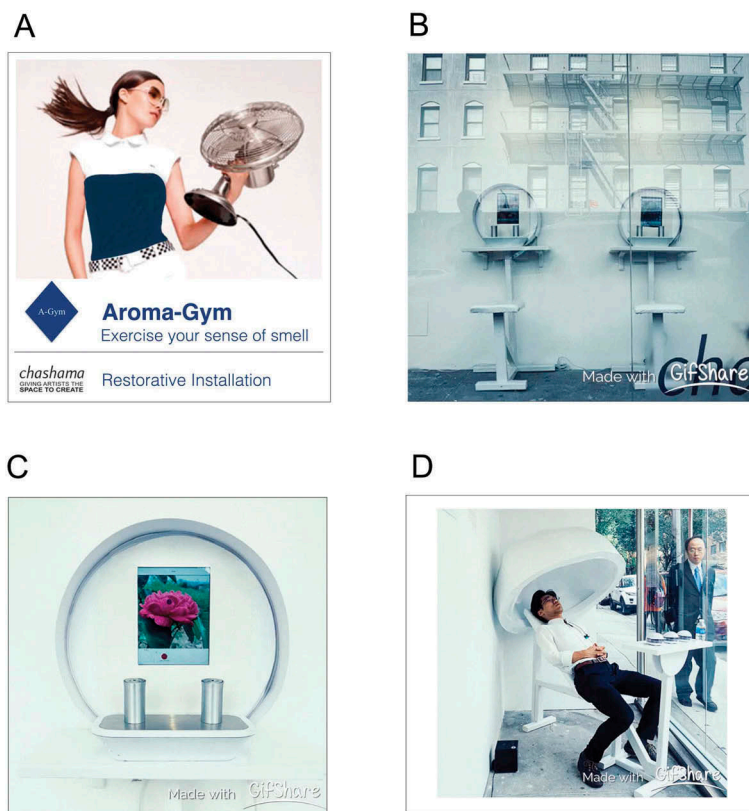


FIGURE 2 The Aroma Gym™ experience at ChaShaMa 300 Gallery in New York (Oct 3–Oct 17 2015) depicted on Instagram by @gerard\_segovia: A) Aroma Gym™ flyer at ChaShaMa, B) street view of Aroma Gym™, C) oPhone prototype displayed at Aroma Gym™, D) Air Sculpture® SpaceWood 40SUS at Aroma Gym™.

the nasal cavity. Next, gym-goers are invited to test and train their odor-detection and identification capabilities by tapping the iPad screen affixed to the wall to emit an odor from the blue-tooth enabled digital scent player containing a set of scent cartridges and a small fan (Figure 2C). This “oPhone,” as it’s called then, presents as art object. Sniff. Now try to conjure the name for this odor-object in your mind. Having difficulty? Tap the screen to reveal the answer: an image of a pink rose, English lavender fields, or roasted coffee beans might appear on the screen. Try again. This time, concentrate. Repeat the scented memory game until fatigued.

The final olfactory exercise station contains a reclining bench with domed hood (in lieu of a barbell), known as the Air Sculpture® SpaceWood 40SUS (Figure 2D). Gym users are advised to explore the spatiality and temporality of scent by reclining back and forward to locate the movements of three singular aromatic notes (Vanillin Natural, Violet Leaves

Absolute, and Paradisone™<sup>3</sup>) under the scent dome, each unfurling according to their unique molecular properties and the airy movements of bodies and breath. After a melodious *Aroma Gym*™ workout using oPhone scent technology, the giddy promise of a more acute nose meets the olfactory melee of Manhattan streets. Departing the olfactory pleasure dome of *Aroma Gym*™ is a nasal shock!

Smell art, suggest Shiner and Kriskovets (2007), is that which engages or foregrounds smell as an aesthetic medium while also provoking thought or making a statement about our experience of smell. As such, olfactory art has critically examined the sociocultural and embodied politics of smell (Drobnick 2012; Drobnick and Fisher 2008), including spatial and temporal dimensions (Straughan 2015), often through art-science collaborations (Agapakis and Tolaas 2012). *Aroma Gym*™, much like its artist-entrepreneur creators, blurs the boundary between smell art and commercialism in ways that make a prescient statement about digitally scented aesthetic capitalism. The deliriously affirmative *Aroma Gym*™ experience feels like part smell awareness workshop, part day spa, and part franchise investment opportunity; a bouquet of sentiments, including fear, are conveyed in a single post on Instagram by @gerard\_segovia (11/07/2015):

*Aroma Gym*™/Exercise your sense of smell/Study Warns That Losing Your Sense of Smell May Mean You May Not Live Much Longer #looseweight #healthylife #exerciseyoursenses #aromacare #happynose #skinfitness #inpersuitoffitness #business #innovation.

As this social media post suggests, Segovia and Laudamiel cultivate an olfactory thinking-space for simultaneously imagining and advertising a future in which *Aroma Gym*™ is found on every corner, alongside other commercial-therapeutic spaces: yoga studios, salons, spas, and gyms of all kinds. The cheeky trademark and franchise vibe of this temporary installation, it turns out, makes palpable the very real capitalist entanglements of smell art, and even smell research, with the F&F industry. What we first perceived to be smell art simulating commerce, we later came to understand as commerce simulating art (and science) (Thrift 2012).

The oPhone at *Aroma Gym*™, we later learned, was a commercial prototype for Cyrano, the first digital scent player, developed by David Edwards, co-founder of Vapor Communications (Figure 3). Christophe Laudamiel, prior to *Aroma Gym*™, we also discovered, had already helped launch oPhone/Cyrano as a consumer product by sending (via oNotes app) the “first transatlantic smell message” from Paris to the American Museum of Natural History in New York City where “the scent of champagne and macaroons” was received by Edwards (Twilley 2014). The geography of this digital scent transmission, from the historic perfume capital of the world to the iconic American science institution, is symbolic of the F&F industry’s reach and trajectory. The F&F industry has scented everyday spaces, practices, and objects to the extent that research on the behavioral effects of particular scents (citrus, lavender, etc.) cannot be disentangled from proprietary scents. For example, in a study titled “the smell of virtue,” the authors conclude that “clean scents summon virtue, helping reciprocity to prevail over greed and charity over apathy” (Liljenquist, Zhong, and Galinsky 2010). Absent from this study is any ethical consideration of using Citrus-Scented Windex®, a proprietary product of SC Johnson (also maker of Glade), rather than lemon essential oil.

*Aroma Gym*™ also used proprietary fragrances developed and sold by David Edwards’ company Vapor Communications (in partnership with International Flavor and Fragrances) and by DreamAir which is Christophe Laudamiel’s own ambient scenting company,<sup>4</sup> rather than

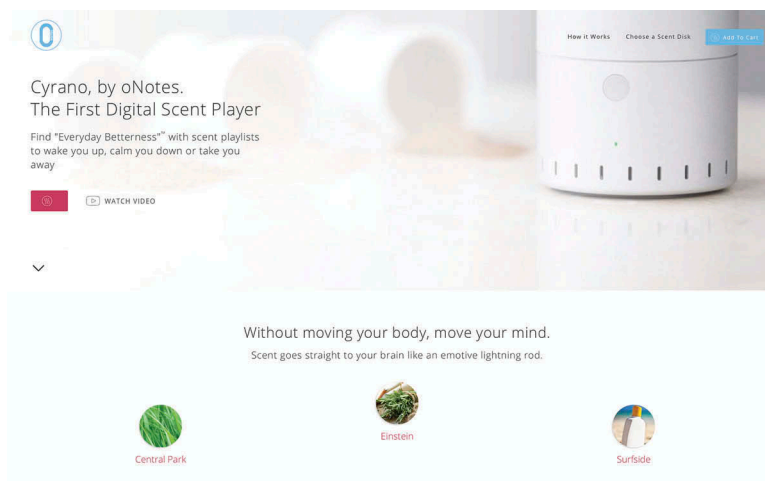


FIGURE 3 Cyrano “the first digital scent player” advertised on the oNotes website.

using naturally extracted aromatics: essential oils and herbs distilled from plants which have been used for therapeutic purposes for millennia (popularly known as aromatherapy). Whereas essential oils are widely available to consumers by a number of companies and can even be made at home, proprietary scents and fragrances are not. Additionally, “smell training,” the purported performative and conceptual basis for *Aroma Gym*<sup>TM</sup>, has actually been gaining traction as physical therapy for strengthening olfactory function. Focused concentration while sniffing strong essential odors (twice a day for 12 weeks) can improve cognitive olfactory processing (Kelly 2017; Majid et al. 2017). In an interview, Thomas Hummel, “the father of smell training,” says, “focusing on one’s olfactory impressions makes a person better at recognizing them” (Grens 2016). What olfactory impressions, we wonder, are imprinted by smell training with Cyrano at *Aroma Gym*<sup>TM</sup>? In both smell art galleries and research spaces, participants are unknowingly exposed to brand name proprietary scents, potentially strengthening existing smell memories and imprinting (brand) new ones.

The use of proprietary fragrances from F&F firms is not uncommon in the smell art world (Shiner and Kriskovets 2007), but the boundary between commercialism and smell art is increasingly troubled by commercialism disguised as art/science. A few months after *Aroma Gym*<sup>TM</sup> took place in lower Manhattan, the creative firm Radical Media unveiled *The Museum of Feelings*, a temporary art installation exploring smell and mood in New York City. Billed as “the first museum that reacts to emotions—and turns them into art,” the experiential social/sensory media installation turned out to be an immersive Glade® advertisement commissioned by SC Johnson, placating and priming New Yorkers to shop. Keller (2015) observes in his review of the installation:

The exterior color supposedly uses social media data to “reflect New York’s ever-changing mood in vivid color;” the current light pink exterior indicates “calm” on the Museum of Feelings’ arbitrary mood scale. ... Considering that earlier this day, Twitter and Facebook were dominated by the news

that two terrorists gunned down 14 people in San Bernardino, California, I'm not sure the museum's barometer was all that accurate.

Smell "art-ads," such as *Aroma Gym*<sup>TM</sup> and the *Museum of Feelings*, are exemplar of expressive infrastructure, a term Thrift (2012, 14) coins and describes as the channeling of affect and imagination "such that every moment becomes an opportunity to both make a sale and explore the subsequent moment: capitalism wants to run at the rate of life itself." There are no stops in olfaction. "The act of smelling something, anything," writes Thomas (1990, 280), is remarkably like the act of thinking itself;<sup>5</sup> a speed and intensity advertised by Cyrano<sup>6</sup> as "an emotive lightning rod" to your brain.

Find "Everyday Betterness"<sup>TM</sup> with scent playlists to wake you up, calm you down or take you away. Without moving your body, move your mind. Scent goes straight to your brain like an emotive lightning rod. (oNotes 2017)

Manipulating molecular affects of olfaction generates ongoing "points of sale," all the while seeding futures through the potent impress of smell and memory. At the frontier of economic opportunity, expressive infrastructure integrates physical and psychological spaces such that atmospheres are continuously and pre-emptively productive, colonizing moods, memories, ideas, and affects (Thrift 2012). More than two decades ago, Deleuze (1990 [1992], 6) wrote that capitalism is no longer about spaces of enclosure; "it is essentially dispersive," transforming, twisting and snaking its way. This is prescient of olfactory economies we sense wafting in the airs and atmospheres of these digital days.

Diffusing solid perfume from a small cartridge equipped with a circulating fan is not high technology. Digital scenting devices like Cyrano recombine existing products in novel ways, "extending the world of innovation out from spaces of the corporation to spaces of the consumer" (Thrift 2012, 146), a hallmark of capitalism as expressive infrastructure. Cyrano's innovation lies in twinning standard scent with the sensual affordances of digital technologies (Cyrano and oNotes used in concert with smartphones), combined with slick advertising and marketing accentuating brain-based claims for better moods-memories-minds, generating new affective atmospheres of consumption (Figure 4): "Design your mood. Design your air" with Cyrano, or "Switch on your mood" with Moodo®: "the smart home fragrance box" conveniently compatible with Amazon's Alexa (Moodo 2018).

Promoting better feelings through brain-based claims situates digital scenting devices alongside other mood-enhancing substances, practices, and "technologies of self" (Connolly 2002; Foucault 1988; McCormack 2007). "The smellscape is an emotive environment, not an intellectual one," Porteous (1990) reminds us. The profound connections between smell, memory, and emotion, long observed by sensitive humanists (Nietzsche to Proust) and recently confirmed by the cognitive sciences are explicitly conceived as the site for physiochemical intervention via digital scenting technologies and practices. In the first half of the Cyrano promotional video, Vapor Communications co-founder and Harvard Professor David Edwards describes how the neurochemical process of olfaction is manipulated and controlled for, what he terms awkwardly, personal "betterness":

The secret to feeling well can sometimes be as near to us as the powerful first scent of spring. Scent connects us more fully to our emotions and memories than any other sensation. That's because of the five sensory nerves, only the nerve for scent goes straight to our brains. Scents can wake us up,

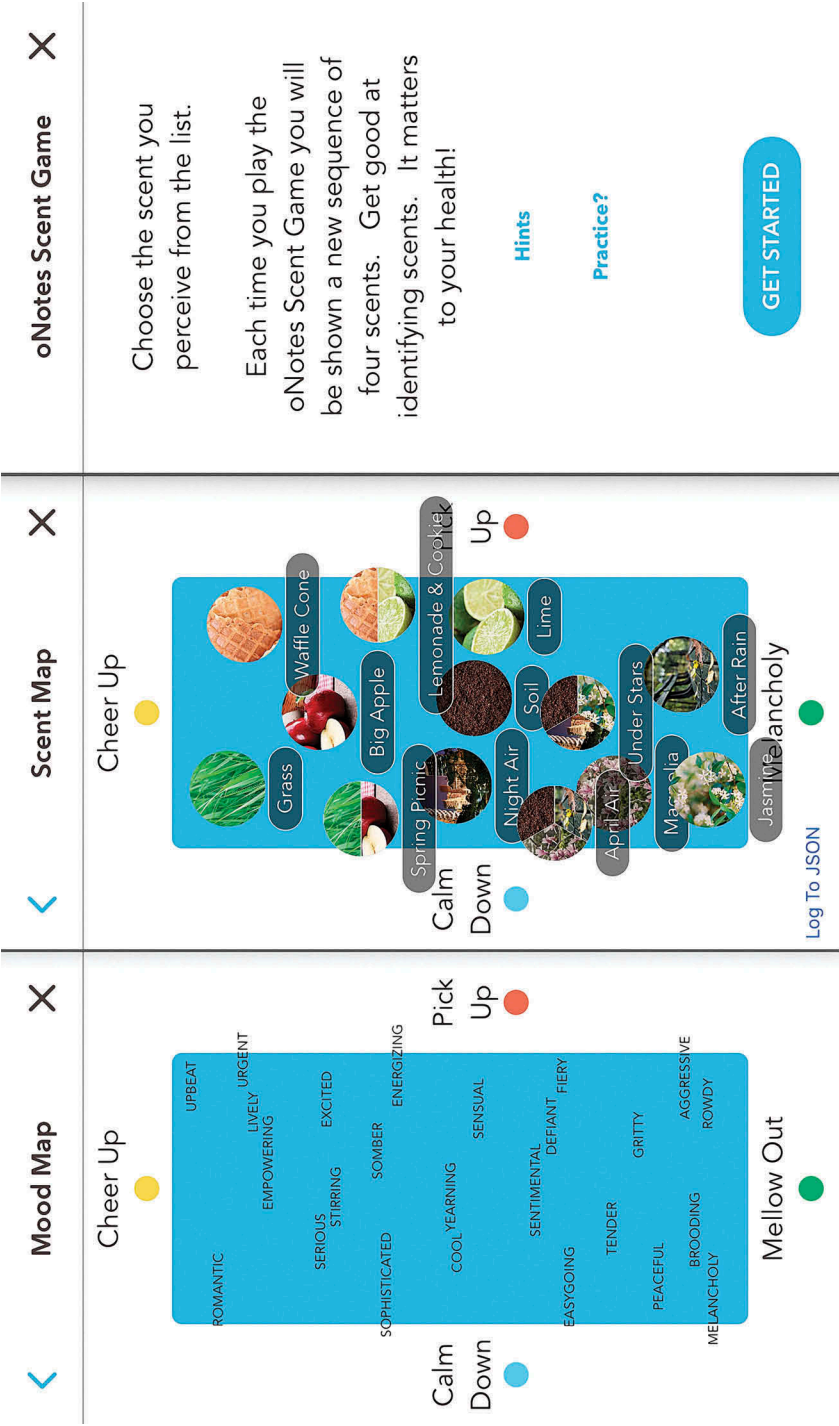


FIGURE 4 Screenshots of the oNotes iPhone application, for use with Cyrano, depicting mood-scent mappings and a scent training game.

relax us, satisfy our cravings, excite us and evoke a thousand memories. But our noses go blind to a scent after just a few minutes, what scientists call olfactory fatigue. While sound can be as endlessly interesting as music, we haven't invented the equivalent music of scent, until now. Introducing Cyrano. Cyrano is a digital scent speaker that you control through a special app. Just as you can connect your phone to a speaker and experience your favorite music anytime, anywhere, Cyrano gives you the unprecedented ability to design your mood with medleys of scent, or olfactory notes which change over time. (Vapor Communications 2018)

Little more than a costly and glorified air freshener, as even Edwards admits (Twilley 2016), Cyrano advertises and conditions new scenting habits and aesthetic sensibilities, the very techniques successfully employed in normalizing air conditioning via aspirations of a new embodied sensibility, *thermal comfort* (Ackermann 2002). Edwards sees digital scent devices "as the future of wellness," suggesting the arrival of a new aspirational embodied sensibility, *emotional comfort*. Scent-conditioned air is not fresh air nor clean air, it's better air! Better air, as the air conditioning industry established, is about the dream of better selves through technologies affording atmospheric (air and affect) control (Ackermann 2002). This is aesthetic capitalism (Bhôme 2017); the creation of sensual-affective desires which intensify through (temporary) fulfillment. The affective states engendered through the "thermal monotony" of a/c, Healy (2014) demonstrates, leaves languid air-conditioned bodies vulnerable to commercial exploitation in malls and shopping spaces. Drawing on similar affect-laden lexicon, promotions of digital scenting technologies describe states of ultimate comfort (relaxation, restfulness, wellness), capitalizing on molecular properties and processing of olfaction in new ways, rendering bodies open and vulnerable (Bissell 2008; Harrison 2008; Healy 2014).

Consumer noses are vulnerable to both passive (unconscious) and active (conscious) modes of exploitation. Devices like Cyrano seek to regulate both. Consider that the olfactory system is always "on" in the background of human attention, ripe for covert or subliminal advertising through ambient scenting (Bradford and Desrochers 2009). It is also capable of learning through conscious attention and practice. Ambient scenting in commercial spaces, much like a/c, has become ubiquitous owing to decades of marketing research findings that scented air is integral in the manipulation of environmental cues (sensory appeals) affecting consumer behavior (i.e. enhanced memory for brands, increased likelihood of purchase, etc.) (Rimkute, Moraes, and Ferreira 2016). With the addition of airports, hotels, luxury apartments, gyms, and hospitals, there are few spaces in modern life without proprietary, branded synthetic scent in the air (Kaysen 2016). The home fragrance retail market is already a \$6.4 billion industry, reports the New York Times; one consumer survey calculates that 73% of Americans used room deodorizers or air freshener sprays last year with an expected 77% by 2020 (Kaufman 2017). Classic "analog" air fresheners are also increasingly advertising their mood-enhancing properties rather than their ability to supplant malodors, a twentieth-century selling point. "What will you feel?" reads the tagline for SC Johnson's familiar suite of Glade® room fresheners, scented candles, and car Plugins® or "Express who you are in your space," and "You don't have to find yourself. Let yourself in."

Capitalizing on unconscious processes of olfaction, Cyrano as digital device introduces scent as "involuntary vulnerability" (Healy 2014) cultivating everyday, scented atmospheres in concert with the very devices we now use to do the majority of our shopping: online, on apps. Digital scenting primes private air spaces and vulnerable bodies for commercial consumption (Paterson 2006). Importantly, Cyrano is designed to circumnavigate what the

fragrance industry refers to as olfactory fatigue and chemosensory scientists know as sensory adaptation to an odor through prolonged exposure, an important operational and episodic rhythm of the olfactory system. An odor persists, but our perception of it changes, as the odor seems to diminish or disappear. Temporary desensitization to a benign odor affords the nervous system sensitivity to detect new odors, with new information entering the scene. Promising to overcome this “nose blindness,” Cyrano operates through an alternating on/off cycle, emitting scents for 2 minutes, then pausing for 2 minutes, ostensibly keeping the olfactory system alert and attentive, strengthening learned scent-impressions. Programmed to perpetually play “pleasant” scent medleys, digital devices can desensitize noses, and diminish attunements to information in the air.

### OLFACTORY ALARMS AND TRAPS

In addition to the subliminal effects of ambient scenting, Cyrano harnesses focused attention and cognitive learning (Kolindorfer et al. 2015; Majid et al. 2017) with proprietary scents. This “voluntary” vulnerability manipulates attention, cognition, and affect in creating lasting and troubling Cyrano scent impressions. A single “wild” odor contains hundreds of aromatic volatiles. The aroma of brewed coffee, for example, contains over one thousand aromatic compounds; imagine the celebratory admixture of the first scent of spring! Lab borne scents are synthesized distillations of a signature compound found in the “wild” scent. Cyrano further simplifies complex feelings and scents into single scent “notes” and “mood medleys” for digital emission and repetition. Molecularly, there is no difference between a single aromatic compound extracted from a plant and one synthesized from petrochemicals; the arrangement of carbon, hydrogen, and oxygen is considered “natural-identical.” In terms of the affective political economy, there is a huge difference between the two. Consider, as Grenville (2017) does, the example of beta-damascenone, a single compound of the 149 others in rose oil. Two hundred dollars will buy you a kilo (2.2 lbs) of petrochemically derived synthetic beta damascenone but less than a teaspoon of naturally derived rose essential oil, of which only 1% is actually beta-damascenone. Scented consumer products began proliferating in the mid-twentieth century as a direct result of advancements in organic chemistry (gas chromatography and mass spectrometry) affording new capabilities to cheaply synthesize flavors and fragrances from petrochemicals. Perfumes and air fresheners cannot obtain a US trademark (unless the scent has no practical function other than branding), but they are protected intellectual property; fragrance ingredients need not be disclosed to consumers (Cronin 2015). Today, the top 11 F&F firms<sup>7</sup> account for 78% of the growing \$27.5 billion dollar industry (Perfumer & Flavorist 2017; Pollak 2011).

When proprietary, branded scents and pleasant feelings (primed via marketing) coincide through intentional habit, potent visceral associations are formed about what childhood, home, and place feel (smell) like (Orth and Bourrain 2008). The preponderance and persistence of scented childhood memories occur because first scent-impressions are encountered frequently at a young age (Sugiyama et al. 2015). As a survival sense, odor detection involves the involuntary assignment of a feeling, a hedonic value (“good” or “bad”), to an odor through autonomic (physiological and neurological) response (Bensafi et al. 2002). Consider the difference between encountering a whiff of Butyric acid in an Italian restaurant (Parmasean cheese) versus in a high school locker room (sweaty socks).<sup>8</sup> Because odor perceptions are

learned (beginning in the womb), previous contextual experiences and expectations inform instantaneous visceral response. Iconically scented American consumer products (e.g. Pine-Sol®, Pledge®, Play-Doh) endure, persisting in the present for this reason.<sup>9</sup> “The single most compelling trend in fragrances right now is the relaunching of classics,” says a report by the Fragrance Foundation, a New York-based trade association for the fragrance industry (Van Arnum 2003, 12). “This makes sense for a lot reasons. ... It triggers an emotional response in the consumer. It imparts a sense of continuity with the past.”

If Cyrano can make first scent-impressions through priming mood expectations, harnessing attention, and emitting a signature scent to form new smell memory, subsequent use will strengthen the learned associations (Herz 2016). When consumers first tap “get relaxed” on the screen, they expect to feel relaxed with this proprietary scent medley; it may just work. And work better the next time. The context of this scent impression matters. “Cyrano,” Edwards reveals in the second half of the promotional video, “is about to change what it means to drive a car, forever.”

Meet Heidi. Each day Heidi drives to her job at a startup in downtown Boston. Her commute is 20 minutes on a good day, 2 hours on a bad one. No matter the weather, or how long the drive, Heidi uses her Cyrano to get energized, or relaxed, or to take a detour to the South Pacific. Heidi made a personal scent melody to remind her of a trip she did last year to Bora Bora. It combines the scents of vanilla, suntan lotion, and guava. She even uses her Cyrano at home to fall asleep to the mood medley she calls Lavender Fields of Provence. The Pacific Islands and the French countryside used to be half a world away, now they’re as close as Cyrano. (Vapor Communications 2018)

Personal betterment, with Cyrano, is curating fragrant air and pleasant feelings, no matter how foul the outside air and environs may be. Play your Bora Bora scent medley to *feel better* about generating CO2 emissions contributing to anthropogenic sea level rise threatening Bora Bora’s very existence. *Sleep better* knowing your Lavender Fields of Provence scent medley will always be available, unlike actual lavender fields of Provence, already endangered owing to climate change-related drought conditions in the South of France. Cyrano depicts a new everyday olfactory geography (Rodaway 1994) in which the purported benefits of scent-conditioned indoor air (better moods, memories, minds) supplants embodied experiences in outdoor environs (parks, beaches, farms), and sedentary smell “exercise” in the car achieves “wellness” rather than ... well, physical exercise. “As we adapt to each new instrument and device and learn to (re)interpret the world,” writes David Nye (2007, 86), “we may be losing touch with other modes of understanding.” Learning, with Cyrano, to “stop and smell the digital roses” may be gravely consequential.

Cyrano, like other technical objects, Ash (2013) reminds us, actively produce spatiotemporal atmospheres, shaping humans and other objects immersed in them. Digital devices, by design, are irresistible. The sensual imperatives of these interfaces colonize human attention, individually and collectively, in ways that make it the most valuable twenty-first-century commodity. The inability to willfully focus attention on short-term goals, argue those who study digital dependency, ultimately diminishes pursuit of long-term goals, which are critical to personal and public life, to humanity’s higher moral purpose. “Degraded environments, then,” writes Doran (2013, 130), “are inseparable from degraded consciousness, in a dual pattern of degradation that at once devalues what is experienced and lowers experiential quality.” That we now need our devices to save us from our devices suggests cognitive capitalism is dangerously close to



FIGURE 5 Cyrano + oNotes Twitter post.

depleting remaining human “mindshare” reserves. This mindlessness is suggested in the prevalence of paid digital “wellness” applications claiming to combat digital distraction by charging for services that used to be free, when we still had attention and willpower, like reading a book, meditation, and going for a walk in the park. The degradation of experiential quality, cognitively and environmentally, through digital distraction is suggested in this Cyrano tweet (Figure 5): “It’s a beautiful morning in Central Park—experience it anywhere with Cyrano’s Central Park scent!” Resisting the mindlessness of the “attention economy,” is, for many, a pressing ethical challenge of our time (Williams 2018); it is the basis for which all other human decision-making on a damaged planet depends (Doran 2013, 2017).

Cyrano advertises “the future smells good.” Our critical aesthetic experiments cast doubt on this claim. The monetization of “eyeballs” through the design of digital interfaces has decreased cognitive attention, concentration, and decision-making. Digitally monetizing noses portends anesthetization of our oldest evolutionary survival sense, capable of chemically sampling and safely navigating complex environments. Through commercializing, synthesizing and now digitizing scent, the affective force of nasal nostalgia is enlisted in curating olfactory worlds further distilled and diminished. Cyrano affords consumers emotional comfort with experiences (driving) and commercial fragrances (petroleum-derived) contributing to environmental loss

and catastrophe. Deep attention and deep time are connected in earthly ways. Olfaction and the cultivation of mindful attention, as “alternative technologies,” are the only resistance to cognitive capitalism (Citton 2017), the only route to reclaim the ambient, and we might add olfactory, commons.

Pursuit of better selves through better noses trained by Cyrano speaks to the alluring molecular affects of scent for humans. Episodic, ephemeral, and elusive—scents make chemical contact, instantaneous olfactory impressions, and then withdrawal. Scent allures (Harman 2010; McCormack 2015b). Aromatic economies have been instrumental in driving human civilizations, from the perfume trade in ancient Egypt to the global spice trade to today’s fragrance & flavor (F&F) empire (Classen, David, and Synnott 1994; Reinartz 2014). Olfaction unconsciously shapes human sociality, from why we shake hands to the size of our social network (Zou et al. 2016). The role of smell in human health and well-being is increasingly understood to be significant. Three examples are illustrative: (1) changes in smell are now an early indicator of Alzheimer’s disease (Lafaille-Magnan et al. 2017), (2) exposure to the aromatic properties of trees may boost human immune systems (Li 2010), and (3) among older adults, olfactory function is the strongest independent predictor of 5-year mortality (a stronger risk factor than heart failure, lung disease, and cancer) (Pinto et al. 2014). “This evolutionarily ancient special sense may signal a key mechanism that affects human longevity,” write the authors (2014, 8). That full scientific understanding of odors and olfaction remains out of reach for humans is a testament to the elemental exorbitance of scent.

## SCENTING IN THE WILDS

Serres 2008 [2011] imagines a future planet extensively appropriated and despoiled by the stench and effluvia of “the scented ape” (Stoddart 1990). Perhaps this frightening prospect moves in synchronicity with another nightmare: imagining a world in which *Homo sapiens* cannot smell at all! To be moved by the elemental properties of the earth is to be moved by scent. “In the ambiguous partialities of the sense of smell the old nostalgia for what is lower lives on, the longing for immediate union with surrounding nature, with earth and slime” (Horkheimer and Adorno 1987 [2002], 151). Those who have lost their sense of smell<sup>10</sup> speak of a primal sense of loss, of a fundamental dislocation from others and place: “With smell, when breathing in, the world comes inside us. Without smell, when I see things, they just stay where they are. They are nothing to do with me” (Wilson 2016). New digital scenting devices contribute to changing human perceptions in ways that diminish sensitivity to the subtleties and diversity of smell, to that which stinks, to the episodic rhythms of the olfactory system and the smellscape (Porteous 1990). *Aroma Gym*<sup>TM</sup> and Cyrano sensitize bodies to pleasant scents—moods—memories, seductively simplified, producing a kind of industrial monoculture, obscuring ecological connections, lively and destructive. We are reminded of the cautionary statement of Tsing et al. (2017, M7): “Living in a time of planetary catastrophe thus begins with a practice at once humble and difficult: noticing the worlds around us.” The desire to perpetually curate “positive” moods by playing pleasant scent medleys channels capacities in particular ways, rendering bodies vulnerable to the affective pull of commercial advertising. New, strange, repulsive, and noxious scents leave us exposed in other ways, to be sure, but they also open capacities to act, to be curious, to question, to resist. Will noses trained with Cyrano’s jasmine,

rose, and lavender scents notice that these very flowers are losing their fragrances owing to a warmer, polluted planet? Did you know they already are?<sup>11</sup> Scents—especially synthetic ones—mark, inhabit, and trail bodies and environs; the arts of attuning with odor as a biogeochemical planetary force begin, nose first, in everyday scented situations.

The properties of olfaction exploited by the F&F industry, we contend, also afford critical neopolitical intervention through experience and experimenting (Connolly 2006) with the poetics and politics of scented air (Engelmann 2015). Smell training, cultivating habits of attention in aromatic worlds, need not take place with proprietary scents in commercial spaces—or inside at all. Reclaiming smell as an environmental sense—through cultivating everyday habits of critical attention, curiosity, and sensitivity to “wild” and worldly odors—is what Tsing et al. (2017) term the “arts of living on a damaged planet.” Olfactory attunements contribute to art-aesthetic approaches (Brigstocke and Noorani 2016; Engelmann and McCormack 2018) engaging the Anthropocene as “a primarily sensorial phenomenon: the experience of living in an increasingly diminished and toxic world” (Davis and Turpin 2015, 3). The human nose is capable of detecting a trillion odors; this is more than the number of colors the human eye can see or tones discernible by the human ear (Bushdid et al. 2014). In these swirling odorous multitudes, the human nose is particularly sensitive to atmospheric affects tinged with memory and nostalgia, a seemingly superfluous affordance, which, in actuality, is critical in species survival. The first scent of spring, like *all* scents at this planetary juncture, is a multi-species matter. “Perhaps,” says Thomas, “instead of spending the resources of our huge cosmetic industry on chemicals for the disguising or outright destruction of odors we should be studying ways to enhance the smell of nature, facing up to the world. In the meantime, we should be hanging on to some of the few great smells left to us, and I would vote for preservation of leaf bonfires, by law if necessary” (1990, 281).<sup>12</sup>

Musky matters take hold of our lives, musky molecules summoning, seducing, colonizing moods and memories. The F&F industry is pivotal in harnessing, channeling, and expanding the affective political economy of scent via a massive elemental infrastructure hidden in plain scent. Odorants marketed as “natural” and “pleasurable” impress and inhabit habituated bodies. Cyrano tells us: “we can create and precisely control a personal scent space and moment.” In the tentacles with which aromatics move, this kind of micro molecular mood control is chimerical, and reminds us of claims of human mastery and control in bio- and geo-engineering our way to a better and sustainable future in the Anthropocene (Hamilton 2013). In matters of air and atmosphere, there is always an excess that exceeds reasoned and rational logics. We feel our way, guided by olfactory attunements and tentacular thinking, catching a tendril, following the scent, rising from earth, suspended in airs.

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## NOTES

1. The name Secaucus is derived from the Algonquian words (spoken by the Lenape, the original inhabitants here) for black (seke or sukut) snake (achgook) to mean “snake land” or “salt marsh” (Mann 2005, 144).
2. This phrase is our inspired variation of Deleuze and Guattari ([1980] 1987, 311): “One ventures from home on the thread of a tune.”
3. Paradisone™ is a synthetic jasmine-scent developed by one of the top F&F firms, Firmenich (Geneva, Switzerland). In 1966 Firmenich chemists discovered the molecule Methyl Jasmonate in natural jasmine oil and shortly afterward synthesized a synthetic compound named Hedione® (a best-selling perfume ingredient globally), which was further synthesized to create Paradisone™ in 1996. Twenty-first-century technologies, both in chemical analysis and digital communication, afford F&F competitors new capabilities to reverse engineer, replicate, and share chemical trade secrets.
4. Christophe Laudamiel is also known for his role, as the perfumist, in creating the scent opera *Green Aria* first performed at the Guggenheim Museum in 2009, with writer/director Stewart Matthew and composers Nico Muhly and Valgeir Sigurdsson. In exploring “the human struggle with nature” using synthetic scents, critical reviewers of *Green Aria* (Parr 2018, 265) note the commercial implications of the artwork. Matthews, a former American investment banker, and Laudmiel were, at the time, also partners in Aeosphere, a scent media company (dissolved in 2011) working to develop the very scent dispersal technologies, like Cyrano, which are now commercially available.
5. “This is as it should be, I suppose, since the cells that do the smelling are themselves proper brain cells, the only neurons whose axons carry information picked up at firsthand in the outside world. Instead of dendrites, they have cilia, equipped with receptors for all sorts of chemical stimuli, and they are in some respects as mysterious as lymphocytes ... they are also the only brain neurons that replicate themselves” (Thomas 1990, 280).
6. *Cyrano de Bergerac*, the French play written in 1897 by Edmond Rostand, also served as inspiration for Stanley Milgram’s pilot studies into “cyranoid” social psychology. “A cyranoid is created,” write Corti and Gillespie (2015, 30), “by cooperatively joining in real-time the body of one person with speech generated by another.” Participants interacting with a cyranoid cannot often discern the speech shadowing deception taking place. Milgram’s interest in the “cyranic illusion,” suggest the authors, likely emerged during his infamous obedience experiments. Moving in the F&F industry’s scented airs and affects, to what extent are we all becoming-cyranoids?
7. Givaudan, Switzerland; Firmenich, Switzerland; International Flavors & Fragrances, USA; Symrise, Germany; Takasago, Japan; Mane, France; Frutarom, Israel; Sensient Technologies, USA; Robertet, France; T. Hasegawa, Japan; Huabao International, China.
8. This exercise was simulated with Butyric acid and contextual photographs projected on the screen during a smell science workshop at the Monell Chemical Senses Center in Philadelphia, “the world’s only independent, non-profit scientific institute dedicated to basic research on taste and smell.” Discussion with Monell scientists and participation in their 2015–2018 workshops were integral to this research. A critical moment in smell science and olfactory geography took place in 1986, when Monell and National Geographic embarked on the largest smell survey ever conducted (Gibbons 1986). The influential results, including the prevalence of smell diminishment and loss due to viral infections, occupational hazards, and aging, were shared with the public in 1987 (Gilbert and Wysocki 1987).
9. Play-Doh recently obtained a US trademark for its signature scent in celebration of its 50th anniversary, making it the 13th “scent mark” to have been registered with the US Patent and Trademarks Office (Siegel 2018).
10. Olfactory disorders such as anosmia and hyposmia (full and partial smell loss, respectively) are conservatively estimated to affect 20% of the general population. This invisible disability can result in profoundly diminished quality of life and increased mortality risks (Croy, Nordin, and Hummel 2014).
11. Floral scent production in flowers is diminished by warmer growing conditions (Cna’ani et al. 2014) and air pollution further degrades floral scents emitted in the air (Fuentes et al. 2016), causing pollinators to forage for longer distances in search of scent trails (McFrederick, Kathilankal, and Fuentes 2008). Floral scent, suggest Burkle and Runyon (2017), is “the smell of environmental change.”

12. We are, of course, aware of smoky, deleterious health effects of “leaf bonfires,” a ritualistic practice of yesteryear now banned in most urban and suburban places across the U.S. Like one of the co-authors of this paper, we imagine that Lewis Thomas’s fondness for leaf bonfires can be traced to childhood memories of crisp autumn days and nights. In our reading, Thomas’s (1990) intentionally strident call for preserving leaf burning speaks to the potency of nasal nostalgia.

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