

The Odor Value Concept in the Formal Analysis of Olfactory Art

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Commemorating the 50th anniversary of *Marcel Duchamp's* death

In the past 15 years, there has been a tremendous increase in the emergence of olfactory artworks despite the traditional skepticism with respect to scents as subjects of art. This essay submits that this skepticism lacks aesthetic justification; art is what is accepted as such, and olfactory art is in fact already well accepted as an art form by the general public. However, there exists no methodological tool for the formal analysis of olfactory artworks. The essay suggests such a method, based on odor values; this is elaborated using the fragrance 'Dune' (Dior, 1991), and is compared with a purely visual approach to the same subject. This new concept allows for the derivation of simple compositional sketches and is then exemplified by the formal analysis of three more recent olfactory artworks: *Elodie Pong/Roman Kaiser*, 'White' (2016), *Martynka Wawrzyniak/Yann Vasnier*, 'Tears (T6)' (2012), and *Christophe Laudamiel*, 'heat' (2003).

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Introduction: The Magic Carpet Ride

'I dabbled on Dune. Immediately, I was transported to a smoky Bedouin campfire in the North African desert. Our camel caravan was trekking to the bazaar, loaded with bags of myrrh and frankincense, cloves, honey, salt, and lemon oil. I love how scent takes me on a magic carpet ride.'^[1]

'This dune theme was something new to [Mondrian], virtually the first appearance in his work of nature in its vastness and all-encompassing magnitude.'^[2]

Perfumes take us on a fascinating journey; they tell stories^[3] by the air we breathe and change the way we perceive the world. Scents can enlighten, educate and entertain, and they are capable of seducing, sensualizing, stimulating, soothing, and even shocking. Whether they draw attention, convey an inspiring perception or present a surprising fresh angle on life, fragrances are made to enjoy and evoke aesthetic feelings. Even more so than with other art forms, olfactory art critically depends on the creative synergy between the materials available for composition. Creative and artistic freedom beyond mere reproduction of existing smells from nature, obtainable by

distillation and extraction techniques of these very substances, became only possible by chemical synthesis of pure odorants, so-called smelling principles. The first ones were coumarin and vanillin, the smelling principles of tonka and vanilla beans, respectively. Coumarin with its odor of marzipan and freshly mown hay was first synthesized by *William Henry Perkin* in 1868.^[4] It was first used by *Paul Parquet* in 'Fougère Royale' (*Houbigant*, 1884) to evoke in the central accord with oak moss and lavender the imaginary scent of ferns, which in reality with very few exceptions are odorless.^[5] Vanillin with its typical vanilla odor was synthesized in 1874 by *Ferdinand Tiemann* and *Wilhelm Haarmann* by enzymatic hydrolysis of coniferin and subsequent oxidation. *Aimé Guerlain* used it first in his groundbreaking 'Jicky' (*Guerlain*, 1889) in an accord with coumarin, (–)-linalool, isolated from rosewood, bergamot, lavender, civet and sandalwood oil. 'Jicky' changed perfumery forever in being neither an Eau de Cologne made for refreshment purposes only, nor an attempt to imitate a flower in classical style: True to nature in materials and proportions but idealized in character. Accordingly, *Chandler Burr*, founder of the Department of Olfactory Art at the Museum of Arts

and Design in New York, classified 'Jicky' with its emphasis on spicy-aromatic individualism contrasted by the warm-sensual emotions of sandalwood, vanillin and coumarin as a work of Romanticism.^[6] The floral-aldehydic 'L'Interdit' (Givenchy, 1957) by Francis Fabron is Burr's example of Abstract Expressionism, though one can argue that Ernest Beaux's 'Chanel N°5' (Chanel, 1921) is more illustrative of an expressionistic style by intentionally breaking with natural references by its aldehyde overdose, and by distorting harmonies of floral scents, in this case the floral harmonies of 'Quelques Fleurs' (Houbigant, 1912) by Robert Bienaimé.^[7] Chandler Burr classifies 'Aromatic Elixir' (Clinique, 1971) by Bernard Chant as Classic American School, the aromatic fougère 'Drakkar Noir' (Guy Laroche, 1982) by Pierre Wargnye as Industrialism, 'Angel' (Thierry Mugler, 1992) by Olivier Cresp as Surrealism, 'L' Eau d'Issey' (Issey Miyake, 1992) by Jacques Cavallier as Minimalism, and the peony–lily-of-the-valley bouquet of 'Pleasures' (Estée Lauder, 1995) by Annie Buzantian and Alberto Morillas as Photorealism. The classical rose-patchouli-labdanum-benzoin accord of 'Prada Amber' (Prada, 2004) by Carlos Benaim and Max and Clement Gavarry is Burr's example of Neo-Romanticism, and Jean-Claude Ellena's osmanthus-tea interpretation 'Osmanthe Yunnan' (Hermès, 2005) his illustration of Luminism, while he classifies the green-white galbanum-Serenolide juxtaposition in Daniela Andrier's '(untitled)' (Maison Martin Margiella, 2010) as Post-Brutalism, referring to the use of clearly recognizable 'crude' raw materials in the sense of Le Corbusier's 'béton brut' (raw concrete). However, while art movements such as those named have been based on manifestos or a retrospective allocation to an epoch, the perfumers did not work in these art eras nor were they influenced by certain manifestos, so such allocations appear imposed. Every perfumer has certainly a personal style in his or her approach to a brief but is generally not free in its interpretation. In the case of '(untitled)' it was Martin Margiella, who commissioned the fragrance to be a 'green flash'. Indeed, '(untitled)' is overpowering green nature rather than raw concrete, and in its juxtaposition of nature ('green') and culture ('musky') quite sophisticated. Yet, we can certainly identify style periods in perfumery arising from personal styles. The success of 'Trésor' (Lancôme, 1990) by Sophia Grojsman with its cosmetic 'hug me' accord of Hedione, Galaxolide, Iso E Super and methyl ionone in almost equal proportions is an example that initiated a perfumery period. This monolithic composition style was heavily influenced by functional cosmetics and personal care products with its focus on long-lasting soft and

smooth materials. Without difficulty, we can identify an aldehydic era commencing with 'Chanel N°5' (Chanel, 1921), followed up by 'Arpège' (Lanvin, 1927), 'L'Interdit' (Givenchy, 1957), 'Madame Rochas' (Rochas, 1960), 'Calandre' (Paco Rabanne, 1968), 'Rive Gauche' (YSL, 1970), and ending roughly with 'White Linen' (Estée Lauder, 1978) by Sophia Grojsman. The introduction of Calone 1951 (1966) initiated a marine period, starting with 'Kenzo pour homme' (Kenzo, 1991) by Christian Mathieu and lasting until 'Hugo Element' (Hugo Boss, 2009). 'Angel' (Thierry Mugler, 1992) by Olivier Cresp initiated a gourmand epoch around maltol and ethyl maltol that lasts to the present day with 'Prada Candy' (Prada, 2011) by Daniela Andrier and 'La Nuit Trésor' (Lancôme, 2015) by Christophe Raynaud and Amandine Marie leading the way into the future. Current creation styles are heavily influenced by the fruitchouli genre around 'Coco Mademoiselle' (Chanel, 2001) by Jacques Polge, and the dried-fruits contrasted extreme ambergris tonality of '1 Million' (Paco Rabanne, 2008) by Christophe Raynaud, Olivier Pescheux and Michel Girard on the masculine side.

Piet Mondrian's painting 'Dune IV' (1909–1910, Figure 1) is a work of Fauvism, characterized by simplification and abstraction, with large areas of vivid and vibrant simple colors as well as bold and energetic brushstrokes that leave areas of the canvas exposed. Though a transitional period for Mondrian, we see the expressive power of large almost monochrome planes accented by luminous flecks of color, and although essentially flat and monolithic in construction, 'Dune IV' radiates sensuality and softness. While Mondrian's dunes were in Domburg (Zeeland), the Netherlands, the dunes that inspired the brief of Dior were in Granville (Manche), France, Christian Dior's childhood home. 'Dune' (Dior, 1991) by Jean-Louis Sieuzac, Dominique Ropion and Nejla Bsiri-Barbir is a product of the monolithic Grojsman time, constructed around two blocks of Hedione (d5) and Galaxolide (d12) – even more abstract than 'Trésor' (Lancôme, 1990).^[8] There is in fact no ionone floralcy present in 'Dune', but we distinctly smell rose in the mild warm form of 2-phenylethanol (d3), and a jasmine accord with a strongly pronounced indole (d7) side in an otherwise highly transparent block of Hedione (d5).

To Christian Dior,^[9] "'Dune' is a delicate alchemy of precious flowers molten with summer heat and cooled by a languid ocean breeze." To portray this salty-ozone breeze of a calm ocean wafting around dunes, Sieuzac, Ropion and Bsiri-Barbir used Tropional (d6) surrounded by linalool (d4) freshness. Summer heat is transferred by a typical sunscreen accord of (3Z)-hex-



Figure 1. Overlay of the simple, transparent and luminous flacon of 'Dune' (Dior, 1991), designed by Véronique Monod, on the painting 'Dune IV', 1909–1910 by Piet Mondrian (1872–1944), oil on cardboard, 18×13 in. (46×33 cm; The Hague, Netherlands: Gemeentemuseum Den Haag, object number 0334302; this composition by the author uses a public domain image of Piet Mondrian's painting from www.wikiart.org, and places the flacon so as to subtly trace the curvature of the sand dunes in order to provoke a comparison between the visual and the olfactory approach to the theme).

3-enyl salicylate (*d8*) with δ -octalactone (*d9*) and Galaxolide (*d12*), and this summer feeling is introduced right at the beginning of the evaporation curve by the sunny warmth and bright opulence of Italian mandarin oil (*d1*), as is easy to recognize. Some of this cozy warmth and soft sensuality is then introduced to the body of the scent as well by the sandalwood character of Radjanol (*d10*) and the powderiness of vanillin (*d11*).

When the fragrance materials mentioned above are combined to give a rough *preliminary sketch* of 'Dune' (Dior, 1991), that is, a basic outline of the fragrance, analogous to the initial sketch of an artist outlining the basic idea for a painting, drawing or sculpture, it becomes apparent that the somewhat green-leafy seaweed contrast of the original is missing, which would seem to require the further addition of an ingredient providing a natural green-leafy note such as *Stemone* (*d2*) in the compositional sketch. Of course, the genuine perfume 'Dune' (Dior, 1991) consists of many more materials, likely around 40 ingredients; yet, with these 12 compositional cornerstones one can already well sketch out, study and contemplate about the fragrance.

This provides the basis of a method for assessment of fragrances as *objets d'art*. After having identified the key elements of a scent, the individual odorants are arranged according to their evaporation profile (vapor pressures) from volatile to substantive. We can then outline each

one as a block, the width of which corresponds to the perceived intensity of the ingredient, while the height indicates the duration of its perception moving along the evaporation curve of the scent from top to middle to base note. The *y*-axis will thus be a measure of the percentage amount of a given material in the formula, while the *x*-axis will correspond to the common logarithm of the odor value (OV) as a measure of intensity. The odor value (OV) is defined as the quotient of the vapor pressure (*vp*) of an odorant in the saturated headspace and its threshold (*th*) concentration,^[10] $OV = vp/th$.^[11] The threshold concentration in turn is the smallest concentration of the odorant in air which is still perceptible by a statistically significant number of panelists and is generally reported as the geometrical mean of the individual values for the different panelists. Standardized olfactory thresholds are available as tables in print.^[12] Vapor pressures can either be found in online databases such as the Dortmund Data Bank (DDB),^[13] or can be calculated from the molecular structure with such software packages as ARTIST.^[14] Since the vapor pressure equals the saturated headspace concentration, the odor value (OV) is a measure of how many times the odor threshold is contained in the saturation concentration. Thus, the OV is a measure of the potency of an odorant, and since both the odor threshold (*th*) and the vapor pressure (*vp*) can be expressed as concentrations, the resulting odor value (OV) is a dimensionless figure. To

account for the fact that the sensory perception of potency is not linear but exponential, the common logarithm is used to correlate our perception with the mathematical data, and both correlate astonishingly well. Thus, after adjusting and equilibrating the individual odor blocks in different trials for 'Dune' (Dior, 1991), the schematic representation delineated in Figure 2 was obtained in the fourth trial.

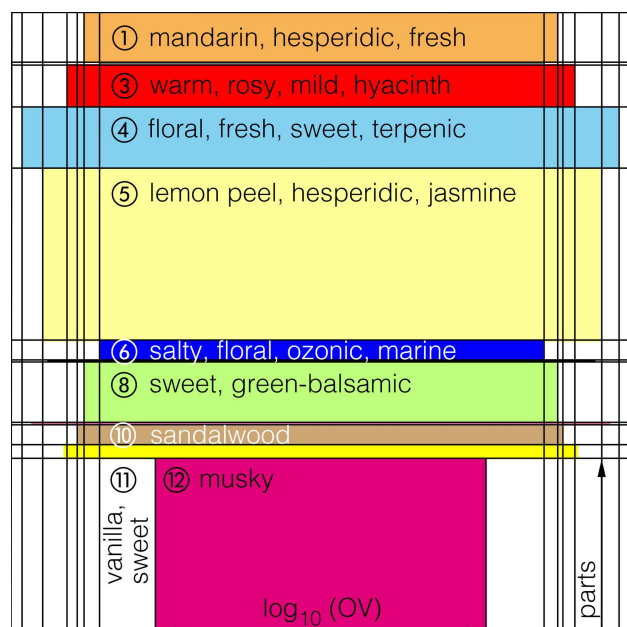


Figure 2. Schematic representation of 'Dune' (Dior, 1991) with the common logarithm of the odor value (x -axis) plotted against the amounts (y -axis) to derive the sketch of Table 1 ($d1$ in the table corresponds to ① in this figure, etc.).

The similar areas indicate that the fresh hesperidic Italian mandarin oil ($d1$) and the rosy opaque 2-phenylethanol ($d3$) are almost perfectly equilibrated, sharply separated and accented by the greenness of *Stemone* ($d2$), then blooming into a transparent floral body of the airy linalool ($d4$) and jasmintic *Hedione HC* ($d5$) in about 2:5 harmony. *Tropional* ($d6$) provides the marine connotation and pure indole ($d7$) underscores the resulting salty, marine, ozonic impression in a highly contrasty way. The sweet green-balsamic (3Z)-hex-3-enyl salicylate ($d8$) forms a counterpart to the linalool ($d4$) freshness on top, and smoothens and extends the sandy, sunny dune landscape accented by additional sweetness from δ -octalactone ($d9$). Comparable intensities of *Radjanol* ($d10$) and vanillin ($d11$) sweeten further until the scent is fixated with the polycyclic musk *Galaxolide* ($d12$).

With this formal analysis at hand, one obtains the 12-line schema of 'Dune' (Dior, 1991) compiled in Table 1, corresponding in relative values to the y -axis of Figure 2. Thereby, an ephemeral olfactory experience may be noted down for future reference.

In his 'Principles of Art History' (1915),^[15] Heinrich Wölfflin (1864–1945) defined five basic pairs of opposed visual perceptions to distinguish the art of the Renaissance from that of the Baroque period:

1. painterly/linear,
2. plane/recession,
3. close/open form,
4. multiplicity/unity, and
5. absolute/relative clarity.

Similarly, five contrasting formal pairs have for quite some time been used to characterize olfactory sensations:

1. pyramidal/monolithic: in the tradition of the *Grojsman* style, the 'Dune IV' sketch in Figure 2 is a prime monolithic, block-like construction as opposed to a pyramidal odor development from base to top.
2. voluminous/contrasty: 'Dune IV' clearly works with contrasts such as *Stemone* ($d2$), indole ($d7$) and δ -octalactone ($d9$) to highlight certain olfactory impressions rather than building a theme by adding common odor aspects to a comprehensive whole.
3. diffusive/substantive: it is easy to recognize in Figure 2 that in 'Dune IV' more emphasis is laid on the diffusivity than on substantivity with comparatively large volumes of linalool ($d4$) and *Hedione HC* ($d5$).
4. light/dark: with the dominance of linalool ($d4$) and *Hedione HC* ($d5$) in addition to the sunscreen accord of (3Z)-hex-3-enyl salicylate ($d8$) with δ -octalactone

Table 1. Sketch Dune IV – a 12-line compositional schema of 'Dune' (Dior, 1991).

	Material	approx. OV	$\log_{10}(\text{OV})$	Parts
$d1$	Mandarin oil, Italy	40'000	4.6	8.0
$d2$	<i>Stemone</i>	20'000	4.3	0.1
$d3$	2-Phenylethanol	80'000	4.9	7.0
$d4$	Linalool	600'000	5.8	10.0
$d5$	<i>Hedione HC</i>	240'000	5.4	28.0
$d6$	<i>Tropional</i>	20'000	4.3	3.0
$d7$	Indole pure	200'000	5.3	0.2
$d8$	(3Z)-Hex-3-enyl salicylate	40'000	4.6	10.0
$d9$	δ -Octalactone	360'000	5.6	0.2
$d10$	<i>Radjanol</i>	50'000	4.7	3
$d11$	Vanillin	100'000	5	2.5
$d12$	<i>Galaxolide</i>	1'500	3.2	28.0
				100.0

(d9) and *Galaxolide* (d12) plus the sunny mandarin oil of Italian providence, the scent of the 'Dune IV' sketch is light, luminous and sunny in appeal.

5. transparent/opaque: despite its brightness and many transparent elements, the rather large amount of vanillin (d11) together with the matte contrasts of Stemone (d2), indole (d7) and δ -octalactone (d9) make the 'Dune IV' sketch in Figure 2 however appear opaque.

Since this list was inspired by the catalogue of Wölfflin,^[15] it is in no way surprising that it as well amounts to five basic pairs; yet, this list of opposing olfactory qualities is not meant to be finite. Professional terminology in the perfume industry as well as the language of so-called 'perfumistas' in portals, forums and blogs on the internet undergoes vivid change, so new descriptive pairs constantly evolve and can be added to characterize olfactory artworks more accurately. Such pairs could for instance include: minimalistic/complex, generic/characteristic, natural/synthetic, or gendered/unisex.

In any case, olfactory works can therefore be formally analyzed in a similar way to visual works. The schematic representation in Figure 2 proves quite useful for this and is in addition capable of capturing an otherwise ephemeral and evanescent experience. In a letter to the Dutch art critic Henk Bremmer from Paris, dated 29 January 1914,^[16] Mondrian stated he "want[s] to approach the truth as closely as possible [by] abstracting everything [...] to the foundation." This also applies to scents and odors as will be shown in the following discussion.

Smells Like Art: Olfactory Art

But can chemical compositions such as smells, odors and perfumes even be the subject of art, aesthetics, and consequently art history? In 'Die Neue Gestaltung: Das Generalprinzip gleichgewichtiger Gestaltung', Piet Mondrian defined "art [as] the [pictorial] expression of our aesthetic feelings."^[17] Nevertheless, he did not confine aesthetic feelings to the realm of the individual and subjective, but explicitly included the universal, the subconscious sensations. In that sense, he understood audio sounds or neologisms as plastic for the subconscious mind as visual art itself. It thus seems counterintuitive that Mondrian excluded the olfactory expression of aesthetic feelings from art, since odors are known to be the most powerful stimuli when it comes to immediate access to the amygdala, the part of the limbic system responsible for processing feel-

ings. Our perception of odors is laden with emotions, motivations, and memories;^[18] therefore, olfactory art should even constitute the ideal medium for the expression and perception of *aesthetic feelings*.

Andy Warhol found that "[o]f the five senses, smell has the closest thing to the full power of the past. Smell really is transporting. Seeing, hearing, touching, tasting is just not as powerful as smelling if you want your whole being to go back for a second to something."^[19] Thanks to Paige Powell, Warhol was even buried with a flacon of his favorite perfume 'Beautiful' (Estée Lauder, 1985) by Bernard Chant, but did not produce olfactory art himself. In 1967, he went as far as spray-painting 100 contour Coca-Cola bottles (original design by Earl R. Dea, 1915, recast by Raymond Loewy, 1957) in silver metallic, filling them with the mass-market citrus cologne 'Silver Lining' (Cassell), capping and signing them as 'You're In (Eau d'Andy)', a Duchampian pun on urine. A cease and desist letter from Coca-Cola forced Warhol to give up on the project, but fifty years later, *Comme des Garçons Parfum* reissued 'You're In' (2017), reinterpreted by Maurice Roucel, in six neutral silver flacons with quotes from the artist such as: "Art is what you can get away with."

However, with the exception of Friedrich Wilhelm Nietzsche (1844–1900), the most eminent aesthetic philosophers such as Plato (428–348 BC), Immanuel Kant (1724–1804), Georg Wilhelm Friedrich Hegel (1770–1831), George Santayana (1863–1952), and Roger Scruton (*1944) considered olfactory impressions too subjective for effective contemplation, and too affective to allow cognitive judgment. In his 'Critique of Judgment' (1790), Kant describes, "[f]or instance, by a judgment of taste [a] rose [...] as beautiful. [...] But then states that the] agreeableness of its smell gives it no claim at all. One person revels in it, but it gives another a headache,"^[20] ignoring the fact that a physiological reaction is no aesthetic judgment. On the other hand, the mild, warm, rosy smell of 2-phenylethanol with its hyacinth-like facets is universally described as beautiful in its own right, just as it is universally agreed that the smell of skatole is disgusting, and that of vanillin or *Hedione* attractive.

With influential disciples such as Heinrich Wölfflin and Alois Riegl (1858–1905), the dialectic philosophy of Hegel was even more decisive for the beginnings of art history, its simplistic view on consecutive contrasting movements and conflicting styles in visual art, and thus its neglect of olfactory art.

In his 'Aesthetics: Lectures on Fine Arts' (1835–1838), Hegel understands art as a spiritual notion or concept that mediates between the senses and reason. A work

of art, though a sensuous object, is not meant for sensuous but for spiritual appreciation: it is symbolizing an idea. Thus, he argues that what is beautiful to the senses is not the beauty of art. *Hegel* sees scent as a direct property of matter, an imminent and immediate quality that allegedly cannot be transformed or spiritualized by the will and work of an (olfactory) artist or (fragrance) chemist. "Consequently [*Hegel* limits] the sensuous aspect of art [...] to the two [theoretical] senses of sight and hearing, while smell, taste, and touch remain excluded from the enjoyment of art. For smell, taste, and touch have to do with matter as such and its immediately sensible qualities."^[21]

Since modern perfumery and olfactory art only started with the industrial synthesis of coumarin and its use in the composition of '*Fougère Royal*' (*Houbigant*, 1884), *Hegel* (†1831) did not live to smell fantasy fragrances, or even witness the creation of novel odorants by the molecular architecture of Synthetic Organic Chemistry. The combinatorial code of olfaction,^[22] discovered by *Linda B. Buck*, *Richard Axel*, and co-workers in 1999, is today an undeniable truism and the basis for the creation of new olfactory sensations by combining fragrance materials (*Perfumery*) as well as the conceptualization of novel odorants by combining osmophores, profile groups and bulky molecular fragments (*Fragrance Chemistry*). By both routes, olfactory impressions never before smelt can be created intentionally, which consequently can also happen in a creative artistic process. The traditional skepticism against the aesthetic value and artistic relevance of scents thus should be obsolete. Those still in doubt and looking for a more philosophical reasoning are referred to two excellent essays on '*The Aesthetics of Smelly Art*' by *Larry Shiner* and *Yulia Kriskovets*,^[23] and on '*Art Scents: Perfume, Design and Olfactory Art*' by *Larry Shiner*.^[24]

Modern aesthetic theories such as those by *Harold Osborne* (1905–1987),^[25] *James Opie Urmson* (1915–2012)^[26] and especially *Frank Noel Sibley* (1923–1996)^[27] include smell as subject matter of aesthetics and as object of aesthetic appreciation. In her account on '*Sniffing and Savoring – The Aesthetics of Smells and Tastes*', *Emily Brady*^[28] has well summarized the arguments for such an understanding, but she has also observed that "[t]he prejudice against smell [...] found its way into the art world. Combined with the fact that sight is our dominant sense, smells [...] have had no role to speak of in the history of art."

For *Marcel Duchamp* (1887–1968), the olfactory dimension thus constituted the perfect medium of

provocation when, coinciding with the advent of photography, the end of the fine (visual) arts was in sight – as *Hegel* had accurately predicted. *Duchamp* did "not believe in painting, in itself. A picture is not made by the painter but by those who look at it – and grant it their favors; [...] I believe in the original fragrance, but like all fragrances, it evaporates very quickly [...]; what remains is a dried nut, classified by historians in the chapter *history of art*."^[29]

To *Duchamp*, smells such as the odor of the oil paint or the turpentine, add an invisible dimension to a painting that symbolizes its origin and originality. This originality is evanescent and fleeting like the smell of a perfume;^[30] and it lays underneath ('*infra*') the object, the thing, it is *infrathin*(g). To *Duchamp*, smells are thus more *infrathin* than colors. A final painting is only the '*dry*' imprint of a '*wet*' original medium, the olfactory dimensionality having been lost in the drying process.

Duchamp even went a step further in claiming painting was just an addictive act of solvent sniffing. For him painting is "olfactory masturbation [...]. Each morning a painter, on waking, needs apart from his breakfast a whiff of turpentine... and if it's not turpentine, it's oil, but it's olfactory. A form of great pleasure alone, onanistic almost."^[31]

While *Duchamp* was the first to introduce the olfactory dimension to the artistic discourse, his olfactory art was nevertheless mostly hidden. His piece '*Air de Paris (50 cc of Paris Air)*', 1919, a readymade glass ampoule (13.5×20 cm) closed by a Parisian pharmacist and intended as souvenir for *Walter C. Arensberg*, was obviously impossible to smell without destruction.^[32] '*Belle Haleine (Eau de Voilette)*' [trans. '*Beautiful Breath (Veil Water)*'], 1921, was a visually modified empty flacon of the successful feminine fine fragrance '*Un Air Embaumé (Eau de Toilette)*' [trans. '*Balmy Breeze*'] (*Rigaud*, 1914) by *Marius Reboul*, a green-balsamic chypre in construction, and not an '*Eau de Violette*' soliflore as alleged by some sources. While *Duchamp* decorated the label with his female alter ego *Rose Sélavy* [trans. '*eros that's life*'], all that was left of *Reboul's* fragrance in the flacon was at most a dried kernel of the vetiver, sandalwood, *Radleïne A* and coumarin from his *Sophora* base – the olfactory dimensionality of the fragrance was lost.

Duchamp did however use smells in the Surrealist Exhibitions he orchestrated: A coffee-roasting machine in the *International Surrealist Exhibition* in Paris 1938 pervading the smell of Brazilian coffee in allusion to the Café Voltaire in Zurich where Dadaism was born, cedarwood scent in the 1942 exhibition entitled *First*



Figure 3. Composite of a public domain photograph of Marcel Duchamp (alias Richard Mutt), 'Fountain', New York, 1917, by Alfred Stieglitz for the magazine 'The Blind Man' (No. 2, May 1917), and an image of a human nose by the author.

Papers of Surrealism, and the powdery white floral–iris perfume 'Flatterie' (Houbigant, 1923) by Robert Bienaimé in the final *International Surrealist Exhibition E.R.O.S.* dedicated to the erotic in art.^[33]

The nose was Duchamp's symbol for revelation and revolution: The ready-made 'Fountain', 1917, a lavatory urinal from J. L. Mott Iron Works, New York, model 'Bedfordshire', turned on its back and signed by Marcel Duchamp as Richard Mutt, constitutes the male counterpart to 'Belle Haleine (Eau de Voilette)'; as dry, as odorless, as untainted; yet, with a clear wet and smelly association. *Fountain* was submitted to the first exhibition of the *Society of Independent Artists* (SIA), April 1917, but not displayed because the jury did not accept it as a work of art. All that is left of the lost original is a photograph Alfred Stieglitz took in his '291' art gallery for the magazine 'The Blind Man' (No. 2, May 1917). In this photograph as well as in Duchamp's cover for the exhibition catalogue '*Marcel Duchamp: Ready-mades, etc. 1913–1964*', and an inverted etching thereof entitled '*Renvoi miroirique*' (trans. 'Mirrorical Return'), 1964, the urinal is only shown from one perspective: a frontal view in which the porcelain urinal resembles a human nose (Figure 3), pointing us again to a hidden olfactory dimension classically not

accepted as art, and to the central underlying question: *What is Art?*

Paul Ziff (1920–2003),^[34] Nelson Goodman (1906–1998),^[35] and ultimately Arthur C. Danto (1924–2013)^[36] reduced this question to the mere context, avoiding a straightforward definition by altering the question to: *When is something art?* However, the Austrian art historian Werner Hofmann (1928–2013) plainly and simply stated, "*art is that which we accept as such.*"^[37] Since the experience of art is individual, the acceptance must be individual, too. The public acceptance of art then becomes a social process, initiated by the claim of the artist that his work is to be considered as art by signing it, just as Marcel Duchamp (alias Richard Mutt) signed his porcelain urinal. Curators then discover and present, art critics reveal and interpret, and art historians analyze and assign, but as Duchamp correctly uncovered, art is ultimately made by the audience who recognizes and values it as art. As for Duchamp's ready-mades, this acceptance can be a process based on many different factors: the social value, the political, the spiritual and/or the aesthetic value of an artwork; even its commercial value, although an artwork must first be accepted as art to attain commercial value. The

commercial value of an artwork then becomes a factor of its quality (mastery of the medium, clarity of execution, authority of expression), provenance, condition, exposure, and authenticity.^[38] Interestingly, for famous art counterfeiter *Wolfgang Beltracchi* (*1951, alias *Wolfgang Fischer*) smell is the single most important criterion of authenticity of a painting, the one most complicated and complex to manipulate and forge, while all visual aspects could be modified and adapted with ease. He stated that “pictures smell of the rooms, where they were hung. So sometimes, I simply thought I can tell by its odor, whether a picture hung in Belgium, or in Germany, or wherever. They simply smell different, don't they?”^[39] The canvas as a headspace filter records a tamper-proof history of a painting, independent from its painting style or visual content. In that way, every painting and every artwork has an olfactory dimension even in its ‘dry’ form. However, this does not make every painting a piece of olfactory art. In olfactory art, smell/scent must be an intentional medium of artistic expression: scent performances, scent concerts, smell sculptures, scent paintings, smell installations, ...^[40] Building on the 1913 Futurist manifesto ‘*La pittura dei suoni, rumori e odori*’ [trans. ‘*The Painting of Sounds, Noises and Smells*’] by *Carlo D. Carrà* (1881–1966) that granted smell for the first time a place in art, *Peter de Cupere* issued in 2014 an Olfactory Art manifesto^[41] claiming further space for scent/smell in art history. He further divided this space into different ‘isms’, speaking for instance of ‘Olfactorism’ when the ‘smell factor of the work itself is central’.^[42] Though this is without a doubt the case for his own works of art, *de Cupere* still sees himself rather as a visual artist who uses smell/scent to provide meaning to a potentially virtual and invisible image.

Due to its evanescent and ephemeral nature, olfactory art can be difficult to collect and preserve,^[42] so its commercial value is still controversial, although many olfactory artworks have been sold, some with composition formulas or other ‘creation recipes’, some with granted (un)limited scent supply by the artist. Contrary to the commercial aspects, however, in exhibitions and museums, olfactory art is naturally accepted as an art form by the general public which according to *Werner Hofmann's* definition (*vide infra*) already makes it art.

Hofmann's view is essentially subjectivistic in nature, maintaining with the ancient views of the Sophists that beauty cannot be debated, but taking as well into account the teachings of *Duchamp's* ‘*Fountain*’ that art and beauty should not be confused. Yet,

even if one follows the modern interactionistic view of Neuroaesthetics, coded as a sub-discipline of empirical aesthetics in 1999 by the neuroscientist *Semir Zeki*,^[43] that beauty is not in the object but in the brain of the beholder and can be quantified by measuring stimulation in certain regions of the medial orbitofrontal cortex,^[44–46] one cannot but include the sense of smell in the enjoyment of art as was vividly demonstrated by *Gordon M. Shepherd*.^[47] In fact, olfaction is the only pathway that projects directly to the multisensory region of the orbitofrontal cortex.^[48] As the input from the olfactory to the orbitofrontal cortex is mostly direct, one is even tempted to say that the best way to experience beauty is through the nose, by the perception of smells. Odor values as a measure of potency, however, do not serve to quantify beauty, but to characterize harmonies and to reveal the construction principles of olfactory impressions. This makes the odor value concept relevant for the aesthetic and artistic evaluation of olfactory artworks.

Outside the academic environment, people clearly challenge the status of olfactory art to a lesser extent than they question today's visual and conceptual art,^[49] possibly because smell/scent directly evokes feelings and emotions that provide context and immediate access to the respective artworks, thereby intensifying the perception of reality. In olfactory art, sensual and spiritual aspects are more closely related than in visual or acoustic art, especially in a modern world of audio-visual overstimulation and overload. Thus, olfactory art offers a high level of artistic authenticity, even an intimacy unattainable by other media. This might explain the huge success of such exhibitions as ‘*Belle Haleine – The Scent of Art*’ (11 February–17 May, 2015) at the Museum Tinguely, Basel,^[33] and ‘*There's Something in the Air! – Scent in Art*’ (22 March–2 August, 2015) at the Villa Rot, Burgrieden-Rot.^[32] Among the most prominent, influential and critically acclaimed olfactory artists today are *Peter de Cupere* (*1970),^[50] *Philippe Di Méo* (*1963),^[51] *Ayşe Erkmen* (*1949), *Heribert Friedl* (*1969),^[52] *Wolfgang Georgsdorf* (*1959),^[53] *Brian Goeltzenleuchter* (*1976),^[54] *Helga Griffiths* (*1959),^[55] *Roman Kaiser* (*1945), *Lisa Kirk* (*1967),^[56] *Job Koelewijn* (*1962),^[57] *Christophe Laudamiel* (*1969), *Gwenn-Aël Lynn*,^[58] *Oswaldo Maciá* (*1960),^[59] *Gayil Nalls* (*1953),^[60] *Ernesto Neto* (*1964), *Camilla Nicklaus-Maurer* (*1983),^[61] *Elodie Pong* (*1966), *Boris Raux* (*1978),^[62] *Klara Ravat* (*1986),^[63] *Sean Raspet* (*1981),^[64] *Geza Schön* (*1969), *Nobi Shioya* (*1958), *Christine Söffing* (*1964),^[65] *Miriam Songster*,^[66] *Jana Sterbak* (*1955),^[67] *Sissel Tolaas* (*1961), *Maki Ueda*

(*1974),^[68] *Clara Ursitti* (*1968),^[69] *Yann Vasnier* (*1976), *Luca Vitone* (*1964),^[70] *Claudia Vogel* (*1971),^[71] *Herman de Vries* (*1931),^[72] and *Martynka Wawrzyniak* (*1979).^[73] Some interesting examples of olfactory art projects were compiled by teachers and students of Communication & Multimedia Design, Avans Hogeschool, Breda, in the booklet 'sense of smell'.^[74]

As for visual art and graphic design, there is also a difference between olfactory art and scent design for functional products. While fragrances for functional consumer products such as cosmetics, toiletries, laundry products, detergents and the like, would *per se* fall into the category of scent design for a functional purpose, many olfactory artworks consist solely of scenting the air like an air freshener, which technically would be considered to be of lower status than a fine fragrance. Yet, many fine fragrances are in reality designer or even celebrity perfumes geared by their designation towards design (be that fashion, product or industrial design).^[75] Again, it is an individual matter of acceptance whether a scent in the air is more than just motivating, fresh and clean, but, on the contrary, olfactory art that moves and inspires.

A formula for olfactory art generally starts with a white sheet of paper or an empty white screen, while scent design begins with established accords from known market products. Scent design has a functional purpose, good olfactory art provides meaning that leaves room for interpretation. Thus, olfactory art is a means of expression of aesthetic feelings that is differently perceived by everyone, while a functional scent design should send the same lifestyle message to everyone.

The perfumery materials of both olfactory art and scent design are the same, but the price criteria are different; the conceptualization and composition make the difference. While the contextual analytical tools established in art history can be applied in the same manner for visual, acoustic and olfactory art, the formal analysis of olfactory art requires a different, specifically olfactory approach.

In the following discussion, three diverse olfactory artworks with few or no visual elements (Olfactorism, *vide infra*) will exemplarily be formally analyzed using the odor value concept described previously in the case of 'Dune' (Dior, 1991) by *Sieuzac, Ropion* and *Bsiri-Barbir*, which, because of its innovative composition and aesthetic expression, is here considered as olfactory art instead of mere scent design. Beyond describing what one smells in an olfactory artwork, this analytical smelling approach will enable the understanding of how the olfactory artist worked and

what he or she wanted to convey. In addition, the technique enables the translation of individual olfactory sensations into simple compositional schemes, so that other art historians can retrace the formal analysis, comment and criticize. While the resulting compositional sketch can never replace the authentic ephemeral experience, it nevertheless can document and perpetuate the olfactory artwork in order to keep it accessible.

Paradise Paradoxe: 'White' (Elodie Pong/Roman Kaiser, 2016)

Though there are endless possibilities for olfactory art, some topics are more prone to realization than others. Ideally suited are those concerned with...

1. surprise and shock value, such as in *Peter de Cupere*, 'The Paintbrush of Gustave Courbet', 2014.
2. personal/material identity, such as *Jana Sterback*, 'Perspiration: Olfactory Portrait', 1995.
3. transformations by smell such as in *Clara Ursitti*, 'Tit and Fire', 2012.
4. places and spaces, such as in *Sissel Tolaas/Geza Schön*, 'berlin, city smell research', 2011.
5. olfactory abstraction, such as in *Job Koelewijn*, 'Broken White', 1998–2004.

Elodie Pong (*1966), 'White', with *Roman Kaiser* (*1945), 2016, belongs to the latter category. In British slang, 'pong' means 'unpleasant smell' as a noun or 'to stink' as a verb.^[76] Thus, the conceptual and video artist, known for her subtle, analytic works, felt a certain vocation for olfactory art, for which she teamed up with *Roman Kaiser*, a pioneer of headspace reconstitutions (RHS). *Kaiser* is renowned for his lifelike reproductions of individual scents from nature, including the vanishing flora,^[77] up to complete olfactory landscape paintings like that of the Ligurian coast, composed from various scent sources.^[78] While generally committed to Realism in scientific accuracy, with many of his accords having found their place in or having inspired commercially-successful fragrances, *Kaiser* did, however, even translate the paintings of French Impressionist *Claude Monet* (1840–1926) into olfactory art in the exhibition 'Monet's garden' at the Kunsthau Zürich, 13 November, 2004. While *Kaiser* is completely committed to the beauty of nature, *Pong's* work on the contrary, addresses human relationships, cultural codes and their influence on modern society. Throughout her work she questions social boundaries and established norms. Thus, to *Pong*, odors are metaphors of our liquid times in the sense of *Zygmunt*

Bauman (1925–2017),^[79] and since breathing means smelling, there is no escape. The result of the collaboration *Pong/Kaiser* is 'White', olfactorily an abstract expressionistic piece, dispersed from white scent diffusers, surrounded by white polylactide 3D prints in the exhibition *Paradise Paradoxe*, 11 March–8 May 2016 at the Helmhaus Zürich (*Figure 4*).

To *Pong* 'White' symbolizes a sensation of being there but not being present: a transparent natural tree note, an idea of jasmine flowers, and a touch of salty water.^[76] *Pong's White* thus is natural white as opposed to the architectural white walls with which *Mark Wigley* became obsessed.^[80] Whiteness is meant as an identity of modernity; yet, here it is not neutral, pure, blank, silent architecture, but immaterial, eternal, immaculate, unpolluted nature. Where white is for *Wigley* the perfect universal color, for *Pong* it is pure reflection, an 'uncolor'. Antiperspirant for *Wigley*, anti-antiperspirant for *Pong*. White is the spiritual color of purity and perfection. It includes everything, symbols certitude and clearness.

Though researchers of the *Weizmann* Institute of Science claimed to have discovered an 'olfactory white' in mixtures of about 30 equal-intensity components,^[81] these mixtures do not smell white but nothingness. Olfactorily there is no blank, empty whiteness, the whiteness needs to be coded by associations, which *Kaiser* accomplished masterfully. Though one might olfactorily first associate white

quite naturally with freshly washed laundry, the white muskiness of a perfectly ironed white cotton shirt as we find it in 'Emporio White For Her' (*Armani*, 2001) of *Alberto Morillas* and *Annie Buzantian* or *Carlos Benaim's* masculine counterpart based on musky white sandalwood, there is no muskiness in the monolithically constructed 'White' by *Pong/Kaiser* and one is quickly overwhelmed by a natural fierce white floralcy oscillating between a fresh floral-aldehydic lily-of-the-valley (muguet) note and a sweet-aromatic Sambac jasmine with green balsamic lily facets, all diluted by a big block of a transparent, fresh hesperidic jasmine note that recalls sundried lemon peels. These elements create considerable volume and the whiteness of the flowers together with the aldehydic and hesperidic elements almost conjures the notion of white paint as there is something almost synthetic present, which reveals itself as a marine saltiness with a slight watermelon character. When moving around in the exhibition, the salt seawater character becomes apparent time and time again with an almost chromatographic gradient. All is very bright, lit by the video installations and spotlights, white from the salty foam of the sea, the image of a lemon on a window bench appears in one's mind hinting towards *Hedione* (*w2*), and the transparent jasminic floralcy gives way in a classical jasmine-santal harmony to soft light white sandalwood that fills out the base of the scent together with the typical transparent woody-ambery



Figure 4. Elodie Pong, *White*, scented rooms with polylactide 3D print in the exhibition *Paradise Paradoxe*, Helmhaus Zürich, 11 March–8 May, 2016. Scent 'White' in collaboration with *Roman Kaiser*: a transparent natural tree note, the idea of jasmine flowers, and a touch of salty water. (Reproductions from the corresponding book of the same title. © *Edition Patrick Frey*. Courtesy of the publisher and *Elodie Pong*. Photos: © *Elodie Pong*, *Giuseppe Micciché*; courtesy of the artist).

character of *Iso E Super* (*w5*). Finally, white sandalwood dominates the woody-ambery character in intensity by a factor of around two, though it is never dominant, and *Osyrol* (*w6*) is therefore chosen as ingredient. Sandalwood odorants smell white because they structurally mimic the steroid 5α -androst-16-en-3 α -ol which is a key odorant of milk;^[82] hence the subconscious color association. For the salty marine character *Calone 1951* (*w1*) is chosen since it provides the aquatic watermelon character.

The delightful white floralcy remains quite enigmatic. On more intense smelling, however, the crisp and clean lily note recalls the ashoka tree, *Saraca indica* L., a sacred tree to Hindus and Buddhists as described by Kaiser.^[83] Kaiser probably used the (*Z*)-1-methylhex-3-enyl salicylate, which he discovered, but which is not generally available as it is a patented captive material. Similarly, the almost aggressively ozoney, white muguet note suggests the probable presence of dihydrofarnesal, also discovered by Kaiser, and still in captive use. Though much softer, cyclamen aldehyde (*w3*) is selected for dihydrofarnesal in the compositional schema of 'White' (Figure 5), and (3*Z*)-hex-3-enyl salicylate (*d8*) already used in the 'Dune IV' sketch (Table 1) to replace (*Z*)-1-methylhex-3-enyl salicylate. The relative strength of the muguet part is estimated at 15% of the lily note, the jasmine

character at 150% of the lily note. There is only a slight saltiness and thus 1% of *Calone 1951* (*w1*) in the sketch seems adequate, considering its high OV of around 1'500'000.

Adjusting the odor blocks in Figure 5 in size to the perceived relative intensities with the common logarithm of the odor value on the x-axis, one can read off the percentage amounts on the y-axis, which gives the compositional schema delineated in Table 2. In the

Table 2. Compositional schema of *Elodie Pong/Roman Kaiser*, 'White', 2016.

Material	approx. OV	log ₁₀ (OV)	Parts
<i>w1 Calone 1951</i>	1'500'000	6.2	1
<i>w2 Hedione HC</i>	240'000	5.4	30
<i>w3 Cyclamen Aldehyde</i>	22'000	4.3	4
<i>w4 (3Z)-Hex-3-enyl salicylate</i>	40'000	4.6	25
<i>w5 Iso E Super</i>	33'000	4.5	10
<i>w6 Osyrol</i>	900	3.0	30
			100

corresponding schematic representation in Figure 5, one can easily recognize that 'White' by Pong/Kaiser is not only monolithic but also that it tapers down in block size from *w2:w4:w6* in a ca. 5:4:3 ratio, providing emphasis on the white floral jasmine-muguet-lily triad.

Although simplistic, the schema in Table 2 provides quite a good approximation, and indeed smells already amazingly white. The original 'White' of Pong/Kaiser is more present and more natural, more aggressive, more complex than the sketch. Nonetheless, the odor value concept in Figure 5 makes the invisible architecture of the scent visible. Whiteness, a supposedly aseptic, clean, hygienic space, is interpreted by the artists here in the natural white shades of salt crystals, white flower petals and white milky sandalwood (*Santalum album* L.).

The 'White' in Pong's *Paradise Paradoxe* smells mud-caked, intensely vibrant and vivid, anything but lifeless, morphing its identity as symbol of our liquid modernity while remaining undefined, untainted and unsoiled – is that the paradox?

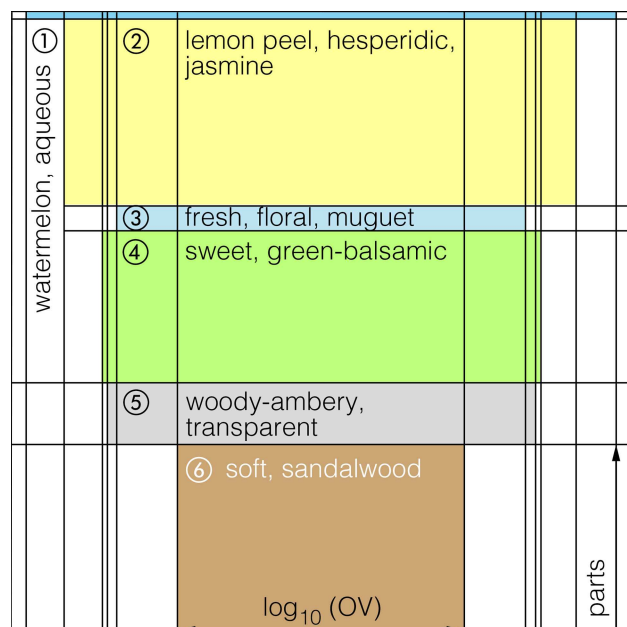


Figure 5. Schematic representation of the construction of *Elodie Pong/Roman Kaiser*, 'White', 2016. The common logarithm odor value (x-axis) is plotted against the percentage amounts in the formula of the compositional schema (y-axis). ① in this figure corresponds to *w1* in Table 2, etc.

Smell Me: 'Tears (T6)' (Martyinka Wawrzyniak/Yann Vasnier, 2012)

Identity, both personal and material, constitutes another central theme of olfactory art. It is quite

possibly the one where the intimate dimensionality of smell comes most into play. In her artworks that appeal to diverse senses, the multimedia and performance artist *Martynka Wawrzyniak* (*1979), who started in photography, often involves the spectator in a deeply intimate encounter with herself. Intentionally, she blurs the boundaries between the artist and the viewer, between the maker of art and the art consumer, between subject and object in art. The perspective is indeed a typical characteristic of the difference between perfumery and olfactory art: by smelling an olfactory artwork, the subject can experience art; by wearing a perfume, the subject can become olfactory art, a vicious circle, since the perfume wearer can become an artwork for another person. Using perfumes or even producing body odors already makes us individual works of art. Intimately experiencing body odors of others can make us either slip into their skin, or literally consume or devour them, just as *Jean-Baptiste Grenouille* was devoured in *Patrick Süskind's 'Perfume – The Story of a Murderer'*.^[84]

While she lets the observer decide how to (re)act to her (artwork), with *'Smell Me'* (2012), *Wawrzyniak* "wanted to take the nude self-portrait to the next level of intimacy. [She] wanted to create a self-portrait that was completely stripped off the visual prejudice that we usually associate with judging a person,"^[85] in other words, a purely visceral self-portrait of a woman, her true essence, free from any visual prejudice.

In the exhibition *'Smell Me'* at *envoy enterprises*, 87 Rivington St, New York, 20 October–18 November, 2012, *Wawrzyniak* presented her spiritual and emotional aura in four scents developed in collaboration with *Yann Vasnier* (*1976), the perfumer behind such fine fragrances as *'Bang'* (*Marc Jacobs*, 2010), *'Oh Lola!'* (*Marc Jacobs*, 2011) with *Calice Becker*, and *'Santal Blush'* (*Tom Ford*, 2011). As did *Süskind's* antihero *Grenouille*, *Martynka Wawrzyniak* captured her bodily scents by enfleurage solvent-extraction techniques, working with the chemistry students *Paul Kozłowski*, *Charles Paszkowski* and *Paul S. Tewfik* under the guidance of Professor *Donna McGregor* at Hunter College. From the corresponding extracts, *'Night Shirt (NS1)'*, *'Sweat (S5)'*, *'Hair (H1)'* and *'Tears (T6)'*, *Yann Vasnier* then reconstructed the corresponding scents that were released inside a specially designed scent chamber, in which visitors could completely immerse themselves in her olfactory self.

'Night Shirt (NS1)' features a spicy-sweet maltol note shimmering between caramelized rye bread and fermented soy sauce with sweet honey notes that slowly turn into beeswax, and floral-animalic indole

and jasmine accents on a dark oak wood foundation, which one associates with *Wawrzyniak's* bed.

'Sweat (S5)' not surprisingly smells sulfuric-sweaty, sweetish-acrid and acidic in butyric and decenoic direction, with buchu and green peppery contrasts. Lactonic coconut notes boosted by coumarin-tonka accents provide a connotation of female skin.

'Hair (H1)' comes across rather unwashed as fatty-animalic, with costus, cumin and coconut, tuned animalic with skatole and civet, while everlasting (*immortelle*) provides a dark straw-like background of decent honey sweetness with a tea-chamomile undertone. A distinct fruity, watery-green note appears as remnant of the morning shampoo.

'Tears (T6)' is the most interesting work of the *'Smell Me'* series as it is the lightest, brightest, most uplifting and cheerful scent, although or quite possibly because the underlying tears weren't anything but tears of joy (*Figure 6*). *Wawrzyniak* collected her tears in crying



Figure 6. *Martynka Wawrzyniak*, *'Tears (T8)'*, 2012. Residue of tears evaporated in pear-shaped Pyrex flask, 5 ml (© *Martynka Wawrzyniak*, New York; photo: © *Martynka Wawrzyniak*, New York; courtesy of the artist).

sessions by listening to songs from her childhood, including for instance those from the Polish movie 'Akademia Pana Kleksa' (1983), and a tape recording with her parents when she was four years of age (Figure 7). Interestingly, she observed in her crying

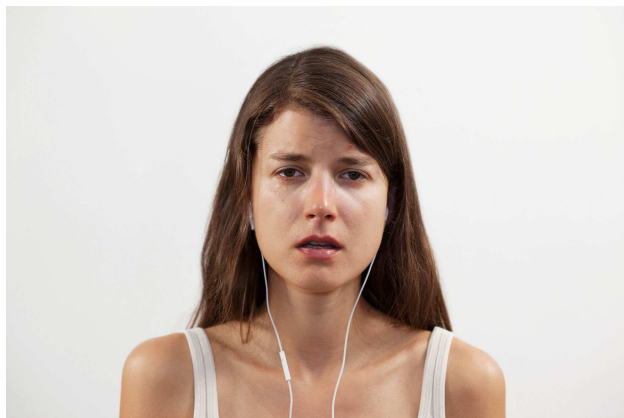


Figure 7. Martynka Wawrzyniak, 'Production of Tears (T6)', 2012, photography, 42×28 in. (106.68×71.12 cm; © Martynka Wawrzyniak, New York; courtesy of the artist).

sessions that the smell of her tears changed according to the trigger of her sadness.

The first impression of 'Tears (T6)' is a refreshing watery, watermelon whiff of raindrops hitting hard on a dry powdery spicy, tallowy-terpenic make-up foundation, dusty-powdery or rather peppery dry. Black pepper (t2) follows in a quick succession of olfactory contrasts, black like eyeliner and mascara running over warm reddened skin, and with it a spicy prickly and tingling nutmeg (t3) feeling and a soft incarnadine fruity-green rhubarb (t4) shade full of relish. The spicy pepper-nutmeg accord appears to be of equal intensity to the watermelon part, which one immediately suspects originates from *Calone 1951* (t1). In the pepper-nutmeg accord itself, the black pepper (t2) sets the tone and dominates the nutmeg (t3) character by an estimated intensity factor of around four (Figure 8). The rhubarb character, probably caused by styrallyl acetate (t4), is of similar intensity, only slightly weaker than the nutmeg part at an estimated 5:4 ratio. This constitutes the top of a pyramidal construction, which one easily recognizes in the growing parts on the y-axis in Figure 8, indicating increasing percentage amounts in the formula from top to dry-down.

After the initial spiciness has vanished, the watery-aquatic part from the top note is taken up with a transparent watery floral-green lily of the valley [Fr. muguet] note, which one can represent well with

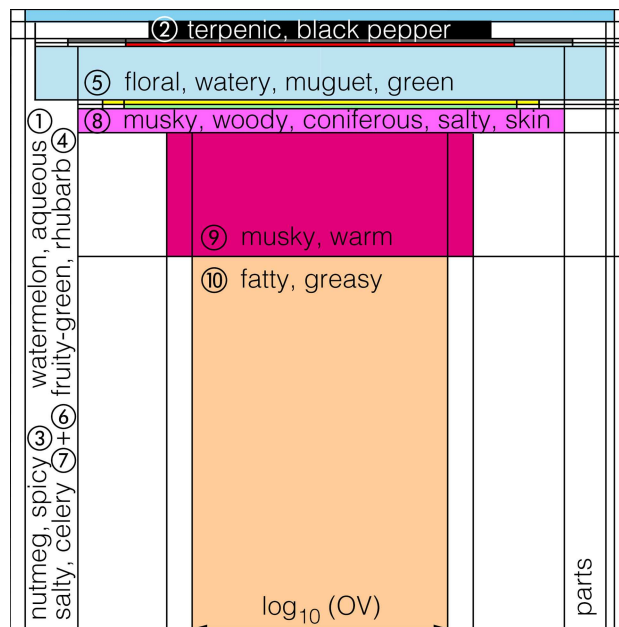


Figure 8. Schematic representation of the construction of Martynka Wawrzyniak/Yann Vasnier, 'Tears (T6)', 2012. The common logarithm odor value (x-axis) is plotted against percentage amounts in the formula of the compositional schema (y-axis). ① in this figure corresponds to t1 in Table 3, etc.

Florhydral (t5), although it certainly is more complex in the original. The impact of *Florhydral* (t5) is estimated at about twice the intensity of all the materials of the top note. Only now does it become clear that all the aqueous moisture, the wetness on the cheeks, is actually caused by tears, since the salty connotation becomes immediately very apparent. One can easily introduce the saltiness by a combination of about equal weights of *Isojasmone T* (t6) and celery ketone (t7), though in the original it is slightly darker, more natural and complex. The herbal celery-infused spiciness of the *Isojasmone T* (t6)/celery ketone (t7) accord recalls salt, since the mind associates over-salted food, especially soup, with celery which coincidentally is present as a flavor enhancer.

The sensuality is raised, and the scent, which actually is very substantive and long-lasting, is fixated down with a carnal musk accord that absorbs some of the tears, and turns them into sensual salty dewdrops, hinting at the salty-sweaty skin connotation typical for *Cashmeran* (t8) as used for instance by Maurice Roucel in 'Dans Tes Bras' (Frederic Malle, 2008). Besides *Cashmeran* (t8), there are more animalic musk components present in *Tears (T6)* which distinctly recall 'Petite Mort (Parfum d'une Femme)' (Marc Atlan, 2011),

reconstituted by *Bertrand Duchaufour* from stained bed sheets. These provide an inappropriate and antithetical erogenous side to the sadness of '*Tears (T6)*'; yet, to keep the compositional schema simple, only *Ambrettolide (t9)*, a warm and soft powdery, skin-type musk, is used here in a 5:1 accord with *Cashmeran (t8)*, which corresponds to a 1:3 intensity ratio. Following the pyramidal construction scheme consequently, the intensity of the musk block corresponds to the totality of everything perceived before.

The whole scent construction of '*Tears (T6)*' stands on an opaque oily, fatty-greasy olfactory pedestal representing the background odor of skin, and this can be represented for reasons of simplicity by methyl linoleate (*t10*) at twice the intensity of the musk accord from *Cashmeran (t8)* and *Ambrettolide (t9)*, i.e. 60 parts. Accordingly, 60% of the formula is used to set a natural skin background with methyl linoleate (*t10*), and this vast amount pushes the background so much to the fore that it partly enwraps and embeds the whole olfactory scenery.

On the y-axis of the schematic representation of the odor values and intensities of '*Tears (T6)*' in *Figure 8*, the percentage amounts for the compositional schema (*Table 3*) can now be read out. Upon comparison of the resulting fragrance with the original, one recognizes that the main construction lines map well, while the sketch in *Table 3* is still somewhat less animalic, softer and more powdery. The erogenous absurdity of sadness in the original '*Tears (T6)*' thus is slightly less apparent, while the deceptive lightness and freshness of the tears are all the more manifest.

Table 3. Compositional schema of *Martynka Wawrzyniak/Yann Vasnier*, '*Tears (T6)*', 2012.

Material	approx. OV	log ₁₀ (OV)	Parts
t1 <i>Calone 1951</i>	1'500'000	6.2	2.0
t2 Black pepper oil, Madagascar	4'000	3.6	3.0
t3 Nutmeg oil, Indonesia	250'000	5.3	0.5
t4 Styrallyl acetate	12'000	4.1	0.5
t5 <i>Florhydral</i>	900'000	6.0	9.0
t6 <i>Isojasmone T</i>	40'000	4.6	0.5
t7 Celery ketone	12'000	4.1	0.5
t8 <i>Cashmeran</i>	120'000	5.1	4.0
t9 <i>Ambrettolide</i>	1'500	3.2	20.0
t10 Methyl linoleate	500	2.7	60.0
			100

Tears are perceived very differently for a person crying as compared to an uninvolved observer, even if their smell might be the same overall. The question of perspective, with which *Wawrzyniak* skillfully plays in '*Tears (T6)*', becomes central in the interaction with the olfactory artwork. To which degree does the observer empathize with or distance from the touching sadness of the light but opaque, voluminous, pyramidal substantive scent of *Wawrzyniak's 'Tears (T6)'* that in itself features refreshing, cheerful and even happy elements? These somewhat absurd elements form a certain barrier to slipping into the skin of the person suffering. In an impressive way, the beholder thus finds out to which degree he or she feels empathy and experiences a desire to slip into another person's skin. In the scent chamber, the experience of '*Tears (T6)*' was an ephemeral experiment, but with the compositional schema in *Table 3* slipping into *Wawrzyniak's* skin can become a reality for anybody who wishes to further study it.

'heat' (*Visionaire 42 Scent, 2003*) by *Christophe Laudamiel*

The last and final example for the formal analysis by odor value methodology is an earlier olfactory artwork: '*heat*' by *Christophe Laudamiel* from the *Visionaire* magazine issue 42 of 2003.^[86] As was previously provided for the catalogue of the exhibition '*Scents of Time*' at the Metropolitan Museum of Art,^[87] '*Visionaire 42*' came in a case with 21 spray samplers. Such box sets, also used for the olfactory interpretation of *Süskind's* novel^[84] '*Perfume – The Story of a Murderer*' by *Christophe Laudamiel* and *Christoph Hornetz*,^[88] offer an affordable way to collect olfactory art as well as to study and enjoy it according to desire and mood. Different from visual art reproductions of paintings, the original artwork becomes directly accessible without any loss of quality. In the case of the '*Visionaire 42*' scents, the samples were even safe to be worn on skin, thus allowing the collector to become part of the artwork.

In terms of categories, '*heat*' by *Christophe Laudamiel* could be assigned to 'transformations' since smelling the artwork makes the observer perceive heat without heat being physically present. The scent thus transforms the perception of temperature. In the accompanying booklet, '*heat*' comes with an art photograph of the same title from *Philip-Lorca diCorcia* (*Figure 9*), but the image only helps to set the scene. The opening of '*heat*' indeed transports us to a hot



Figure 9. Christophe Laudamiel (*1969), 'heat', 2003, Soflux fragrance spray sampler, 5 ml, Rexam, with a smelling strip in front of the corresponding booklet 'visionaire 42 scent' featuring a picture by Philip-Lorca diCorcia (*1951), © Visionaire Publishing, LLC, 2003. (Photo by the author).

summer's day in the city, for instance to a street market or an outdoor café with a watery juicy, sweet but somewhat artificial, fruity-floral melon smell in the air that mixes with a strange ozonic vibe from the urban traffic exhaust in the sun. This intoxicating melon-ozone atmosphere points towards *Methoxy Melonal* (*h1*) with its green side being underscored by the fruity-green rhubarb note of styrallyl acetate (*h2*) as already used as *t4* in the schema of 'Tears (T6)' in Figure 8. Laudamiel fine-tuned and elaborated the fruity facets in great detail to give it a matt coating, so there is an additional soapy-waxy apple-skin note present, but for the overall understanding of the work these are of minor importance and a rough 4:3 intensity ratio of melon (*h1*) to rhubarb (*h2*) materials shall suffice for a schematic representation of the fruity accord in the top of the scent (Figure 10).

What follows is indeed far more interesting and comes all of a sudden. The initial warm sunny fruity impression turns waxy with a sweet, winey-fruity undertone: A hot molten wax odor as typical for higher aliphatic fatty esters, which can be represented by ethyl decanoate (*h3*). Since the scent is available in a spray vial, this is easy to verify by saturating the nose with ethyl decanoate (*h3*) before smelling. This exercise indeed results in subtracting much of the molten wax odor from the overall olfactory impression. The hot waxy odor of ethyl decanoate (*h3*) absorbs in its intensity basically all of the preceding fruity accord, and 'heat' then turns metallic-green rose oxide. Since rose oxide would have been far more volatile though,

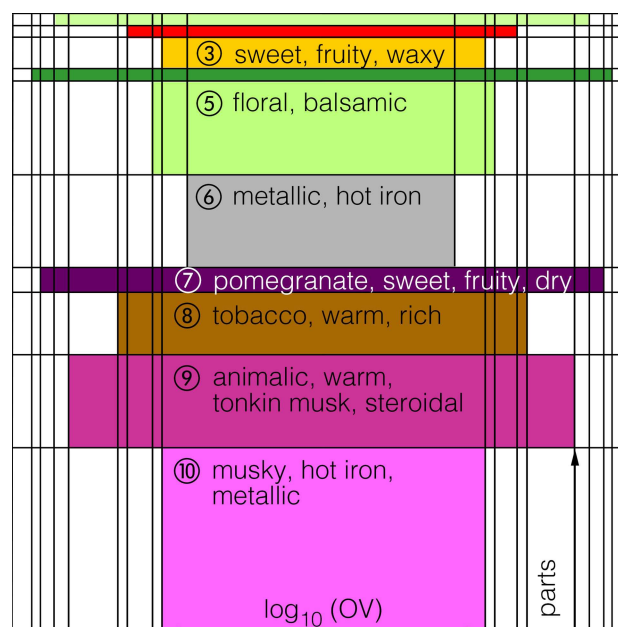


Figure 10. Schematic representation of the construction of Christophe Laudamiel, 'heat', 2003. The common logarithm odor value (*x*-axis) is plotted against percentage amounts in the formula of the compositional schema (*y*-axis). ① in this figure corresponds to *h1* in Table 4, etc.

a substantive material such as *Rosyrane Super* (*h4*) must have been used, building up a crescendo from hot liquid wax to hot liquid metal, the intensity ratio of which is estimated at 4:3. To provide some body to this metallic-green *Rosyrane Super* (*h4*) caesura, it is then extended with about four times the intensity of a

mild green floral-balsamic note, for which 15 parts of hexyl salicylate (*h5*) is chosen here. At this point, the main theme is introduced: heat as radiated from a blazing hot stove plate or hot liquid metal.

While the smell of cold metal results from the reductive decomposition of skin lipid peroxides into C₆–C₁₀ alkanals and 1-octen-3-one as key odorants,^[89] the smell of hot iron for instance upon ironing laundry rather results from medium-sized macrocyclic lactones likely formed from fats, oils and waxes on the hot metal surface. Oxacyclotridecan-2-one (*h6*) is such a 13-membered lactone which typically smells of hot iron and liquid metal, and albeit not being much used in perfumery, it is instantly recognizable in *Laudamiel's* 'heat'. Its contribution accounts roughly for that of the metallic-green block from *Rosyrane Super* (*h4*) and hexyl salicylate (*h5*), and bridges over to the waxy ethyl decanoate (*h3*), thereby generalizing the perception of molten wax and hot iron into abstract heat. To abstract even further and link back to the fruity top of the creation, thereby keeping the summer association alive, *Laudamiel* then places a sweet-fruity albeit dry pomegranate note underneath the hot-iron note, at about half its intensity. This is almost certainly done with *Veltonal* (*h7*) since other ionones would be more violet-iris in character and less dry. *Veltonal* (*h7*) could however also be replaced by α - or even β -ionone, if they are adjusted according to their respective odor values. The pomegranate fruitiness is then tuned down with a warm, rich tobacco-type odor block of almost twice its intensity, which can be represented by *Kephalis* (*h8*), although this is almost certainly missing as such in the original olfactory artwork.

The warm, rich tobacco-type note of *Kephalis* (*h8*) functions as a transition before the molten wax theme is reinforced with the animalic-warm, steroidal ambergris material *Aldrone* (*h9*). *Aldrone* (*h9*) radiates a certain 'sexual heat' with its typical Tonkin-musk sharpness and sensuality and is in addition reminiscent of hot candle wax. *Laudamiel* and *Hornetz* also used *Aldrone* (*h9*) together with *Karanal* to create a candle-light atmosphere in '*Salon Rouge*' (*Thierry Mugler*, 2006).^[88] In intensity, the *Aldrone* (*h9*) block is estimated to be about 20% more intense than *Veltonal* (*h7*) and *Kephalis* (*h8*) combined, which is indicative of a pyramidal construction scheme. Finally, the hot iron connotation is continued as well, and the scent is fixated with a metallic musk accord, for which 30 parts of *Habanolide* (*h10*) are substituted in the construction scheme in *Figure 10*. Being again some 20% more intense than the *Aldrone* (*h9*) block, the hot iron, liquid metal association of *Habanolide* (*h10*) finally wins over

the molten wax theme, and the resulting scent is in result rather substantive.

The quality of this odor value analysis in *Figure 10* can again be checked by reading out the corresponding compositional schema (*Table 4*) on the y-axis. To evaluate the resulting olfactory similarity with the original spray sampler, a 10% dilution in 85° perfumery-grade ethanol is suggested. This dilution also works out fine for the sensory evaluation of the other compositional schemata discussed here. While only ten lines long, the main compositional lines of 'heat' are all apparent from the schema in *Table 4*, and no further adaptation seems necessary.

Despite some monolithic blocks of waxy and hot-iron materials, overall the construction of *heat* is still pyramidal, and despite the fruity contrasts at the beginning, *heat* overall is also very voluminous. Olfactory elements are being taken up, revisited and extended along the evaporation profile to generate volume, and the pyramidal construction enhances the olfactory space further. The summer atmosphere in the foreground, glowing hot metal and the lit candles make 'heat' appear very light and bright in this vast odor space despite the comforting warmth; yet, while there is a certain coziness, the risky and dangerous side predominates from the ozoney outset on. There is a growing feeling of discomfort in the perception of 'heat', an uneasy thought of having left the stove on, and a well-founded fear that a burnt smell will build up the very next moment. This is a sensation that literally gets under the skin, and indeed makes the attentive observer experience real heat upon smelling 'heat' – a truly captivating experience.

Laudamiel conceived 'heat' to be very transparent, with interchanging and repetitive translucent layers of summer heat, molten wax and hot iron accords that peel off like braised onion skins in front of the nose of

Table 4. Compositional schema of *Christophe Laudamiel*, 'heat', 2003.

	Material	approx. OV	log ₁₀ (OV)	Parts
<i>h1</i>	<i>Methoxy Melonal</i>	400'000	5.6	2
<i>h2</i>	Styrallyl acetate	12'000	4.1	2
<i>h3</i>	Ethyl decanoate	2'400	3.4	5
<i>h4</i>	<i>Rosyrane Super</i>	1'200'000	6.1	2
<i>h5</i>	Hexyl salicylate	3'600	3.6	15
<i>h6</i>	Oxacyclotridecan-2-one	600	2.8	15
<i>h7</i>	<i>Veltonal</i>	800'000	5.9	4
<i>h8</i>	<i>Kephalis</i>	21'000	4.3	10
<i>h9</i>	<i>Aldrone</i>	200'000	5.3	15
<i>h10</i>	<i>Habanolide</i>	2'400	3.4	30
				100

the beholder. The balances and harmonies thereby shift from pleasantly warm to threateningly searing heat. *Laudamiel's 'heat'* is a manifestation of great sensitivity in the absence of any physical heat or any physical object, and, according to *Paul Cézanne* (1839–1906) sensitivity defines and identifies the artist: “The artists must perceive and capture harmony from among many relationships. He must transpose them in a scale of his own invention while he develops them according to a new and original logic.”^[90] Olfactory art is built on sensing harmonies and interrelationships between individual materials and their smells. The odor value analysis methodology presented here helps to capture and visualize these relationships.

In contrast to retinal art, olfactory art is certainly a modern art form, though *Jim Drobnick* has demonstrated on the example of *Paul Gauguin* (1848–1903)^[91] that an engagement with the sense of smell has been widespread among artists for a long time. Be that as it may, olfactory art is today generally accepted as art by the public. This public acceptance has happened with even more apparent implicitness than had been the case for photography. Therefore, in analyzing and comparing formalistic aspects and composition styles of olfactory artworks, art history will have to extend its arsenal of methods to olfactory perception, especially with more artists becoming engaged in olfactory art. There might be alternatives to the odor value concept as introduced in this paper, but it goes without saying that neither simplistic fragrance pyramids as used in perfume advertisements nor complex analytical-chemical gas chromatograms will be useful in documenting and understanding olfactory art. The presented odor value approach can however make olfactory art accessible to the formalistic art historic discourse.

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