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Fashion fades, Chanel No.^^5 remains

Fashion fades, Chanel No.^^5 remains: Epistemology between Style and Technology

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Perfume  
historical object  
material history  
experimental recreation  
chemical revolution  
authenticity  
methodology

Perfumes embody a chemical record of style and technology. Blurring the boundary between what counts as natural and artificial in both a material and a perceptual sense, perfumery presents us with a domain of multiple disciplinary identities relevant to social studies: art, craft, and techno-science. Despite its profound impact as a cultural practice, perfume has seldom featured in historical scholarship. The reason for this neglect is its inherently qualitative dimension: perfume cannot be understood via codified representation but requires direct acquaintance with its sensory and material basis. The historical study of perfumery thus necessitates an experimental approach that comes not without challenge. This article looks at contemporary recreations of old perfumes to identify the difficulties involved in the experimental recreation of fragrances as sensory and performative artifacts. We highlight the need for a reconceptualization of methodology for inconcrete objects of study as part of the broader interest in experimental approaches to the humanities.

1. Perfume: Object between Art and Science

<?><?>1. Blog entries and Video articles have been integrated into the References (bibliography); when there is no real “journal” or platform title, the following solution has been applied: e.g., *Lorrieanne.com,* *Penhaligons.com*. 2. The bibliography has been slightly revised according to the author guidelines. Some elements have been added. Please check everything carefully.<?><?>

Fragrances are more than personal adornment. They are a chemical record of style and technology. Perfumery owes its modern appearance to the invention of new technologies of production, discoveries of chemical processes and the development of synthetic materials. Blurring the boundary between what counts as natural and artificial in both a material and a perceptual sense, perfumery embodies different disciplinary identities: from being a secretive art to its modern appearance of techno-scientific creation.

Perfumes are of interest for historical studies of experiment, production, and cultural practices due to their inherently dual nature. Perfumes are a form of art.<fnr1> They are designed to play with our imagination and evoke conceptual images. That much becomes clear when looking at fragrance briefs—documents which, next to notes on pragmatic issues such as target audience and price range, contain short descriptions about the message a perfume ought to convey. Perfume descriptions allude to conceptual images that transcend sensory description of olfactory quality. Consider the classic fragrance *CK One*, advertised as communicating “purity. unity. sensuality” (company description). Modern fragrances intend to express a lifestyle with appeal to individuality and social recognition. They differ markedly in style across cultures as well as history.<fnr2> Perfumes are also a meticulously designed material commodity.<fnr3> They are no less subject to chemical knowledge than are medicinal products, or dyes and inks. Still, these other products received considerably more attention in historical discourse about changing conceptualizations of material objects.<fnr4> This article thus analyzes how to extend historical understanding of culture and production by centering on perfumes.<fn1>Gopnik 2013.</fn><fn2>Ostrom 2016.</fn><fn3>Kraft and Swift 2005.</fn><fn4>Klein and Lefèvre 2007; Klein and Spary 2010. </fn>

To date, in the US alone, 25 billion dollars are made annually with the production of fragrant molecules for products such as detergents, shampoos, perfumes, and soaps—even scented trash bags.<fnr5> Critical to modern perfumery is the design of synthetic odorants (odorous molecules) as well as an understanding of the changing perceptual and social dimensions of fragrance preferences. Nevertheless, perfumery received little attention within broader academic scholarship—a mistake.<fn5>Keller and Vosshall 2004.</fn>

A closer look at the making of perfume, from past to present, reveals a rich repository of unresolved epistemological issues and ontological changes. Fragrance products, displayed in artful flacons and fashionable images, seem radically divorced from the pragmatics of their creation process. What does that tell us about perfumes as material objects and the changing historical understanding of their status?

Perfumery never was comfortably defined as either a science or an art but somehow connected to both. Such disciplinary tension is not exclusive to perfumery, as art curatorship shows. Yet the product of perfumery, ephemeral fragrances, poses challenges of its own. How can we write a history of perfumery without contact with its creations that, by their very nature, hinge on direct sensory acquaintance? What are the possibilities and limits regarding the sensory acquaintance with materials in the historical study of perfumes? This essentially poses a methodological concern. In turn, the focus of this article is on methodology regarding the experimental recreation of historical material. Specifically, what might the reproduction of historical perfumes tell us about the practice of perfumery and the character of its objects in light of the broader historical study of human culture?

This article proceeds in three steps. Starting with the challenge of artifact recreation, we first discuss what kind of knowledge is obtained via experimental approaches to historical scholarship, including the philosophical issues that such approaches entail. Next we look at three case studies from different epochs (Ancient Egypt, eighteenth-century France, and twentieth century-Europe). These cases help identify the unresolved issues involved in the experimental recreation of perfume as a sensory artifact. We then reflect on how the quality and cultural status of perfume changed as a consequence of two major shifts in its production, questioning the notion of what kind of historical *object* perfumes are. The article ends with a brief methodological outlook on how to rethink the historical study of perfume and similar cultural productions that defy analysis via their codified representation.

2. Experimental Humanities: Challenges in Writing a History of Perfume

Experimental reconstructions from the history of art and science have received increasing attention in recent years (e.g., the *Making and Knowing* *Project* at Columbia University), although the application of experimental inquiry in historical studies has been around since mid-twentieth century.<fnr6> Revived attractiveness of empirical methodology in the humanities stems from the material turn, referring to growing scholarly interest in the practices of knowledge production.<fnr7> Cautious voices warned of adopting a fad. What really could be learned *historically* from such an approach?<fn6>Bilak et al. 2016; Fors et al. 2016.</fn><fn7>Hicks 2010. Criticisms about adopting a fad are summarized in Fors et al. 2016. </fn>

Experimental reconstruction answers three general challenges in historical scholarship. First, what kind of additional knowledge does reconstruction provide complementary to traditional analysis? Reconstructive work has multiple purposes. It can clarify ambiguities in written descriptions or serve as corrective to textual interpretation. Additionally, reconstruction shows that empirical knowledge is not just filling in for conceptual analysis. Reconstructive work, next to giving some meat to the bones, can generate new and hitherto unconceived hypotheses. A case in point is the discovery of undocumented elements, expertise, and people, such as the hidden technician in Shapin’s study of Robert Boyle’s experiments on the vacuum.<fnr8><fn8>Shapin 1989.</fn>

Second, how to conceive of the difference between theoretical and practical knowledge?Historical research largely deals with codified knowledge, meaning the formalized representation of descriptive and conceptual content.<fnr9> Hidden from such representation are the steps involved in knowledge codification. Practical knowledge can be structured in multiple ways, and the dynamics that shape the organization and reorganization of codified practice into theoretical knowledge are critical to understanding how materials and practices became related, how disciplines or expert domains have been coordinated, and what kinds of important knowledge was backgrounded in favor of other knowledge easier to conceptualize and communicate as separable from its practice.<fn9>Valleriani 2017. </fn>

Third, how much does the *quantification* of practical knowledge (as related to the historically changing means of production) affect *qualitative* changes that remain invisible from historical analysis of its descriptive representation? This point highlights how the practice of production determines the value of its associated product. In “More is different,” Anderson pointed out that growth in the quantification of material production shifts the assignment of economic value from the end-product toward the means of production, meaning the knowledge required to produce an object.<fnr10> That is true of modern perfumery. Industrial perfume manufacture is notoriously guarded while its products are affordable and widely distributed.<fn10>Anderson 1972.</fn>

These considerations signify experimental recreations (whether replications, re-workings, re-enactments, or re-productions) as a distinct and indispensable research method in historical scholarship. However, such recreation of artifacts also faces methodological challenges that differ from scientific replication and associated challenges. Veridicality, meaning the exact reconstruction of an original event or piece of work, is not what makes recreations useful in the content of historical scholarship. The reason is twofold. On the one hand, veridicality may not be an option. Many surviving artifacts or recorded representations are degraded or incomplete. Other materials do not exist anymore, or are hard to come by, if not illegal to obtain. On the other hand, historical recreation does not exclusively or even primarily target the artifact reproduced. Instead, it may center on the underlying procedure of production.

The recreation of a perfume must aim for *authenticity* rather than veridicality. Authenticity is a much-discussed concept in historic preservation, particularly of spaces and architecture. The Nara Document on Authenticity states that there is no universal way to determine authenticity, and that the preservationist must choose, based on historical context and the character of the thing being preserved, what defines the constitutive pieces of an artifact, and how best to represent them to a modern audience.<fnr11> Authenticity can arise from many sources. In the case of historic spaces, smell plays a contributing factor to certain kinds of authenticity.<fnr12> But for perfumes as artifacts in their own right, authenticity arises from the materials used, the production procedure, or the message delivered to the audience. Further, historical recreation gives access to another dimension of historical reality: its sensory quality. Think about it. When recalling your life, especially memories of childhood and home, it appears deeply connected to smells. The so-called Proust effect, named after the famous autobiographical episode of Marcel Proust dipping the madeleine (a small French cake) into his tea, presents its most popularized expression to date.<fnr13> Similarly, traveling to different countries, one encounters various *smellscapes*: a variety of spices on the Asian continent, the salty breeze at the sea, or the funky odor of tomato vines during Californian summers.<fnr14> Everything smells. But with few exceptions,<fnr15> scholars seldom considered the smells of history and their intellectual heritage. Historical descriptions are rich with sensory, especially olfactory connotations—both in a literal (the stench of seventeenth-century Paris) and more metaphorical sense (e.g., the odor of sanctity).<fnr16><fn11>Lemaire and Stovel 1994.</fn><fn12>Jasper and Otero-Pailos 2016; Otero-Pailos 2008.</fn><fn13>Van Campen 2014. </fn><fn14>McLean 2019.</fn><fn15>Corbin 1986; Kiechle 2017; Tullett 2019. </fn><fn16>Harvey 2006.</fn>

Similarly, historical accounts of perfumery, the profession that perfected the manipulation of odorous materials to create products that constitute expressions of style and *Zeitgeist*, rarely attracted academic interest. Interest came from practitioners.<fnr17> A case in point is the revival of perfume company Le Galion, which began with an introduction at the perfume show Esxence in Milan, where nine of the thirty original Le Galion perfumes for which they still had the formulas were displayed. Interestingly, all perfumes had a historical bent: eight of the nine are from the years 1936--1953, and one from 1972. The fragrances were presented as giving insight into pre- and post-WWII culture. For example, the 1937 perfume refers to Amelia Earhart’s flight around the world and the first publication of the women’s magazine *Marie-Claire*. The 1947 perfume describes the Marshall Plan and how the French people dreamt of luxury and escape. Twentieth-century perfume presented snapshots of popular culture. <fn17>Aftel 2001. </fn>

Perfumes, like all forms of art and fashion, are a conceptual witness of their times. What olfactory themes dominated wartime in contrast to economic prosperity? What social norms about gender and age were expressed through popular fragrance? The history of perfume accounts for the way societal interaction, including status and hierarchy, is enacted at a given time. To study this undervalued part of social history, we highlight the considerations involved in developing an appropriate methodology for the experimental recreation of perfume.

The distinct difficulty with historical studies of perfume is its phenomenological and performative dimension. Unlike other materials, like metals or inks, the final product of perfumery is an ephemeral and volatile creation that develops and vanishes the moment it is applied. Perfumes live and die on the skin of their wearer. Besides, our notorious lack of a coherent and detailed language for odors (outside the expertise of the perfumer, that is) makes it hard to understand and evaluate its codified or textual expression. The formulas of perfumers and evocative descriptions by perfume aficionados tend to sound inspiring yet fanciful to the ears of the untrained smeller.<fnr18><fn18>Turin and Sanchez 2010. </fn>

A case in point: “Inspired by the famous Tea Clipper Ships that navigated the globe to bring exotic wares to British shores, Penhaligon’s *Lothair* opens with the salty tang of grapefruit and juniper, and a brilliant green sensation from fig leaf.”<fnr19> Or, *Black Orchid*:<fn19>Penhaligon’s, “Lothair,” *Penhaligons.com*, online: <https://www.penhaligons.com/us/lothair/> (accessed 11 October 2019).</fn>

was announced as an oriental chypre. The top notes are French jasmine, black truffle, ylang-ylang, black currant, and effervescent citrus. In the floral-spicy heart, dwells Tom Ford’s black orchid, more imaginary than real, and the base combines woodsy notes (patchouli and sandalwood), dark chocolate, incense, amber, vetiver, vanilla, and balsam.<fnr20><fn20>Fragrantica, “Black Orchid Tom Ford for women,” *Fragrantica.com*, online: <https://www.fragrantica.com/perfume/Tom-Ford/Black-Orchid-1018.html> (accessed 11 October 2019).</fn>

Aesthetic analysis of olfactory artifacts, including perfumes or wines and whiskey, requires acquaintance with the sensory dimension of materials (do you know the odor of ylang-ylang?) as well as the refinement of observational skill through perceptual training.<fnr21><fn21>Barwich 2017.</fn>

The difficulty with sensory access also opens new research opportunities for experimental approaches to history, in addition to philosophical engagement with its methods. The inherent need for sensory experience of perfume or other sensory artifacts seems to carry an air of subjectivity that historical research traditionally aims to avoid. Hence, the question is: What can we learn *historically* from the experimental study of perfume?

The omission of perfume from the study of civilization points at an omission in our understanding of history itself—its tacit and experienced materiality as a sensory texture to reality. As expressed by perfume, this texture is social and interactive as well as *performative*. Just like other historically relevant forms of culture and art, from music to dance, perfumes require historians to engage directly with its expression, not just its description.<fnr22> What makes the scholarly engagement with perfume both interesting and challenging, therefore, is that perfumes do not constitute historical objects in the traditional sense. Consequently, the methodology from the study of paintings or sculptures cannot simply be transferred to analyze the cultural practice surrounding the use of perfume. Because “[p]erfume is not an object, it is a site-specific performance or narrative.”<fnr23><fn22>Franko 1989.</fn><fn23>Harad 2011.</fn>

In sum, there are challenges with conceiving of perfumes as historical objects, first because authenticity differs from veridicality in their recreation, second because of the necessary sensory familiarity with smells and their descriptions, and third because perfumes are a performative form of art that unfold over time from a certain user to a certain audience, all of which is based on historical context. In other words, a perfume is not a tangible historical object, but one that must be recreated and consumed as a work of art for which veridicality is likely impossible or even inadvisable.

Despite these challenges, perfumers and historians have recently begun to engage in perfume recreation. What goes into the creation of perfume to understand its historical variability and enactment? How does such recreation aid in the study of perfume as a historical object?

3. Making Scents: Three Examples of Perfume Recreations

Modern recreations of historical perfume are not about veridicality. Their reproduction has mainly been either a non-academic, artistic or commercial pursuit or used for marketing an overarching research project. It would seem that the expression of perfume, hinging on first-person access, is academically incompatible with its historical study via third-person descriptions and comparability. But that impression is misleading.

Experimental inquiry into past scents prompts us to rethink the methodological foundation of historical scholarship and what kind of knowledge we hope to obtain from it. The following examples introduce three outlooks to the experimental recreation of historical perfumes: the first case of an Ancient Egyptian perfume presents a conceptual recreation that aims at cultural authenticity; the second case of Marie Antoinette’s perfume looks at the intricate challenge in balancing material and procedural authenticity; and the last case of a perfume from the “Golden 1920s” demonstrates that even modern perfumes cannot be exactly replicated, and prompts us to reconsider what, epistemologically, we want from a recreation.

3.1 Closer to Cleopatra: Ancient Egyptian Perfume

If you were in Washington DC in Fall 2019, you were in for a treat. Archeologists found a perfume manufacture in Thmuis, an Egyptian city founded 4500 BC, including vials with perfume residue. While not fragrant anymore, the residue’s dried components were partly identified (with chemical analysis ongoing). The research group took this opportunity to commission the recreation of a perfume as representative of the fashion of this period and place, estimated to be 300 BC. This recreation, conducted by Dora Goldsmith and Sean Coughlin, became part of the Queens of Egypt exhibition at the National Geographic Museum. Visitors could smell the tincture, even put a little of its oil on their arm.<fnr24><fn24>Imbler 2019; Mihai 2019.</fn>

Oil is an apt description in this context because ancient perfumes did not contain alcohol but were pressed oils. The recreated fragrance included myrrh, cardamom, green olive oil, and cinnamon. It was a conceptual recreation aiming at cultural authenticity, not a veridical reproduction of a specific object. The degraded residue could not provide a sufficient answer to the exact composition and served more as a heuristic source. Additionally, the recreation drew on related historical sources: knowledge about the contemporary popular and accessible materials next to recipes known from other documents (specifically, the *materia medica*, an ancient Greek text). In the end, this recreation of an Ancient Egyptian perfume represented an approximation to convey a general idea of olfactory fashion in Egyptian history. The fragrance itself was noted as markedly strong, perhaps too strong for modern noses; its qualitative notes were described as spicy and musky.

This recreation was advertised as “the *Chanel No.^^5* of ancient Egypt” and as “possibly worn by Cleopatra.”<fnr25> The latter was a marketing statement, the researchers admitted. Cleopatra is famous for her extravagant use of perfume. (Legend tells that Cleopatra coated the sails of her boat with perfume on her visit to Marc Antony, so that people were to know of her arrival before seeing her.) She had a private perfume workshop where she worked on her own creations, according to Mandy Aftel.<fnr26> (Aftel had been involved in another, earlier recreation of an Ancient Egyptian perfume.<fnr27>)<fn25>Imbler 2019.</fn><fn26>Quoted in Imbler 2019. </fn><fn27>Richter 2005.</fn>

Unfortunately, the recreation procedure remained undocumented. However, we saw that the properties of ancient perfume sound far removed from its modern successors: no fresh, flowery notes but more herbal, musky in ingredients and style, with an oily texture and strong overall sensory effect. Perfumes embodied both medicinal and cosmetic essences.

3.2 Versailles: Marie Antoinette’s Le Bouquet Aux Mille Fleurs

For $2,500, you could smell like Marie Antoinette. Marie Antoinette was known for her lavish lifestyle, and so the recreation of one of her perfumes was not going to be cheap. What sounds like a marketing gimmick was one in parts, to justify the expense.<fnr28> Still, the recreation of Marie Antoinette’s perfume is notable for several reasons: the difficulties in its recreation and its role as a societal signal.<fn28>Anne 2019.</fn>

The original formulas for Marie Antoinette’s fragrance were found in the French library archives by the historian Elisabeth de Feydeau, who was working on a biography of the perfume’s creator, Jean-Louis Fargeon (1748--1806). Francis Kurkdjian, an Armenian perfumer and businessman living in Paris, acquired the formula, originally named *Trianon* after the gardens near Versailles. Its recreation revealed several difficulties.<fnr29><fn29>Feydeau 2006.</fn>

One difficulty is the material side. Two hundred years later, it is impossible to produce a fragrance just the same as the original. Modern ingredients tend to differ, regardless of the recipe. But the recreation of Marie Antoinette’s perfume was particularly delicate as it primarily consisted of flowers. Various flower species differ substantially from each other in scent and the components making the odor plume. Consider *Bulgarian Rose Otto*, harvested in the Rose Valley of Kazanlak. This oil is extracted from one of the rarest flowers; it is very pricey and desirable. Different rose oils behave differently with other components in mixtures. Given their variation in chemical composition, a rose even by the same name, 200 years later, would *not* smell as sweet. Without access to the particular variety used by Fargeon, the recreation of Marie Antoinette’s perfume seemed closer to a reimagination than a reproduction.

This highlights a distinct feature of natural perfume production. Raw materials are highly diverse. Standardized production therefore is limited and tends to be smaller in scale. Moreover, the availability of raw natural materials is bound to harvesting seasons and occasionally unpredictable, considering that flower farming is dependent on weather and other uncontrollable conditions.<fnr30><fn30>Piesse 1857. </fn>

Another challenge was methodological. Before the French Revolution, there was no metric system. Fargeon’s original recipe, translated and reprinted in the appendix of Feydeau,<fnr31> lacked information about the amounts and proportions of materials. Kurkdjian remarked in an interview: “So we had to go back to old books to find the correspondency [sic] between how they were making perfume at the time and how we did now.”<fnr32> Next came the preparation of flowers, which differed from modern practice. <fn31>Feydeau 2006.</fn><fn32>NPR 2006.</fn>

At the time, they were boiling all the flowers all together and you would get a perfume at the end. Now, we distillate the flowers separately and then we can balance and we can find the right equilibrium between all the notes. So it’s a big difference now.<fnr33><fn33>Ibid.</fn>

Overall, there was some guesswork involved, relying on the material expertise of perfumers as a form of tacit or gestural knowledge.<fnr34> Despite these procedural challenges, the recreation yielded historical insight. Starting with its perceptual quality: <fn34>Polanyi 1966; Sibum 1995a; Sibum 1995b.</fn>

The opening of *M.A. Sillage de la Reine* [the name of the recreation] is very fresh and flowery, dominated by a most beautiful orange blossom note. […] It then evolves into a more contrasted impression of being both very soft and deep but also musky. It is also softly woody. There is a splendid indolic jasmine. The tuberose is very marked too and seemingly smells green, perhaps due to the violet. The sweetness and succulence of the perfume is shot through by a fresh aerial impression suggesting a breeze. It smells of lavender. On my skin, as opposed to the impression on the blotter, the perfume is warmer and more powdery, with the orris making its presence felt more. It is apparently a perfume playing with transient flowery notes, yet it gains in intensity overtime.<fnr35><fn35>Wagner 2007.</fn>

In comparison with Ancient Egyptian perfume, the variety of materials and abundance of flowers is striking. The recreated perfume contains “notes of orris, rose, jasmine, tuberose, lavender, violet, bergamot, orange blossom, cedarwood, sandalwood, Tonkin musk, ambergris, and oily galbanum.”<fnr36> Its excessive flowery base is notable for two reasons. On the one hand, flowers were expensive. Putting things into perspective: <fn36>Anne 2019.</fn>

The yield in essential oils can vary greatly depending on the plants being distilled. By way of example, 1^^kg of essential oil requires 5 tons of magnolia blossoms, 4 tons of rose petals, 1 ton of bitter orange blossoms, 500^^kg of clary sage, or 20^^kg of lavender blossoms.<fnr37><fn37>Ellena 2011. </fn>

Modern perfumery can afford flowers to be fashionable on an industrial scale because of their cheaper production via synthetics. But eighteenth-century fragrances usually were musky. This marked *The Thousand Blossom Bouquet* as a signal of status and luxury. Kurkdjian added that the fragrance was

not really musky because musks were very dirty and Marie Antoinette was very different at her time. She was already a trendsetter because she was very clean because she had a bathroom. She had two bathrooms in Versailles, and she was taking a bath every day. <fnr38><fn38>NPR 2006. </fn>

This was not the only innovation in the qualitative dimension of perfume. Notice the difference in sensory complexity expressed in the description of this recreation, especially in contrast with the Egyptian Burial perfume. Notably, Marie Antoinette’s fragrance evolved, showing a facet of qualitative features over time, and thereby exhibiting a temporal dimension (with different odor notes being released after another). This had become possible a few centuries prior with the invention of the serpentine cooling system in Italy around 1320. The serpentine cooling system enabled the production of high-grade alcohol, which dilutes and breaks down mixtures, such that mixture ingredients could be separated and released throughout several temporal stages. Consequently, perfumes now could communicate a narrative of different qualities over time.<fnr39><fn39>Barwich 2020, chapter 1. </fn>

The temporality of alcohol-based perfume, featuring several stages of composition (known as a perfume’s top note, heart note, and bottom note), made knowledge of the formula with its measures and proportions essential to its reproduction and recreation (example formula in Figure^^1<figr1>). High-grade alcohol introduced a new complexity to fragrance composition that grounded in higher variability in the chemical behavior of mixtures. This complexity, in turn, increases the methodological challenge of material authenticity, as it now further hinges on the exactness of production such as the precise but often undocumented proportion of ingredients.

3.3 The Golden 1920s: Soir de Paris

Let’s get to our last case. When Andrew Holding, a trained chemist, discovered a notebook left behind by his grandfather, he also got hold of the recipe for *Soir de Paris*. This journal originally belonged to Constantin Weriguine, a biochemist famous in the world of perfumery. Holding’s grandfather, Charles “Rex” Holding, did not come by such treasure by accident. In the 1960s, he was Chief Perfumer at the Bourjois Chanel factory near London, where he worked closely with Weriguine and the perfume’s co-creator Ernest Beaux (known for *Chanel no.^^5*). *Soir de Paris*, launched in 1928, was a sophisticated fragrance with expensive ingredients. Recipe in hand, Andrew Holding decided to visit the Osmothèque at Versailles, where he met artisan perfumer Stéphanie Bakouche, for help with the perfume’s recreation.<fnr40><fn40>Holding 2019.</fn>

The material side of the recreation posed a number of challenges. The formula contained several key ingredients, including the very expensive *Rose de Mai*, a rose that only blooms in May (15,000 euros per kilo), ambergris, musk, orange essential oil, and ethanol for dilution. Because it was too expensive, *Rose de Mai* was not used. Bakouche used a synthetic version instead. Some details of the recreation remain ambiguous. Ambergris—a rare and expensive material of hardened sperm whale vomit/dung—was not listed as part of the recreation.<fnr41> However, Holding mentioned it when wondering how he would obtain the necessary ingredients.<fnr42> The original recipe calls for animal-derived musk, which today is illegal to procure, but not to use. To achieve a sufficient degree of material authenticity, the recreators thus uncorked one of the last existing bottles of animal-derived musk exclusively for this recreation.<fn41>Kemp 2012. </fn><fn42>Holding 2019.</fn>

With this step, the recreation turned into an original historical artifact itself, and Bakouche stored a small bottle of it at the Osmothèque. The distinct material nature of perfume, with the irreplaceability of some ingredients and their interaction, exemplifies two things. On the one hand, there are material historical dimensions that cannot be recovered. In a time of emphasis on both industrial and epistemic producibility and reproducibility, it is worth reconsidering that such measures and standards may not adequately capture large parts of older historical reality. On the other hand, the impossibility of veridicality in such recreations prompts us to rethink the epistemological dimension of knowledge captured by experimental approaches to history. The recreation of past perfume is closer to a reimagination than replication. As such, the historical analysis of a given recreation must take into account the kinds of authenticity present. A perfumer, then, may be necessary in either the process of recreation, the analysis of the end product, or both.

Perfumery grapples with these concerns when it comes to the continuation of successful classics. Over the twentieth century, perfume manufacture had to adapt to regulations that routinely conflicted with the composition of classic fragrances (concerning potential allergens or the use of animal materials). The answer was to discontinue or to reformulate a scent, meaning to rethink its composition. *Soir de Paris* presents a good example here. The original fragrance was discontinued in 1969 to be revived and reformulated under Francois Demachy and Jacques Pole by Chanel in 1992. Today, its list of notes reads:

The top notes are fruity fresh, featured with bergamot, apricot and peach, green notes and violet. The floral heart is composed of rose Damascena, jasmine, heliotrope, ylang-ylang, lily-of-the-valley and orris. The base includes amber, musk, sandalwood and vanilla.<fnr43><fn43>Smithsonian, “Evening in Paris Cologne,” *Americanhistory.si.edu*, https://americanhistory.si.edu/collections/search/object/nmah<?\_>716382 (accessed 11 October 2019); Fragrantica, “*Soir de Paris* (Evening in Paris) Bourjois for women,” *Fragrantica.com*,https://www.fragrantica.com/perfume/Bourjois/Soir-de-Paris-Evening-in-Paris--3604.html (accessed 11 October 2019).</fn>

The difference between the original and its reformulation is remarkable. Some conceptual elements were kept, with raw materials replaced by synthetics (amber); other materials were replaced by still costly yet more affordable raw materials (rose), while new notes were added as well (peach).

Such compositional differences embody changes in material fashion (fresh, fruity, flowery scents have taken over since the introduction of affordable synthetics) next to production (the reliance on synthetics allows for standardized production on an industrial scale characteristic of modern perfumery). Moreover, such changes resonate with Anderson’s analysis of how quantification in know-how inevitably shifts the relationship between production and product: the economic value of perfumes, today, lies less in the final product than in the strategies and knowledge involved in its production.<fnr44><fn44>Anderson 1972.</fn>

Lastly, this third case of experimental recreation reveals an unexpected opportunity for historical scholarship itself, involving methodological reflections in experimental recreation. As with the case of *Soir de Paris*, the recreation itself becomes an artifact. Indeed, different recreations of the same perfume may vary significantly if the objectives of scholarship diverge. To what extent may a translation of cultural authenticity emphasize different properties of a perfume than attention to material or procedural authenticity? Hence, the products of recreation themselves can turn into an object of historical scholarship.

4. Between Style and Technology: How Perfume Manufacture changed

The history of perfumery presents an interesting domain at the intersection of custom and innovation. The experimental recreation of historical perfume thus hinges on a proper understanding of its methodological dimension, including how these procedural and material changes affect sensory qualities and resonate with shifts in cultural practice.

Many traditional, sometimes century-old techniques remain in use: specifically, *extraction* (the application of mechanical force to materials rich in oil by pressing or grinding); *distillation* (the exposure of materials like flowers to heat to collect their extracts via condensation); *maceration* (using solvents, such as spirits, to separate particular components); and *enfleurage* (extremely delicate flowers were spread over a frame with a layer of fat absorbing their odor within a period of 72 hours).<fnr45><fn45>Piesse 1857; Sagarin 1945; Aftel 2001; Guentert 2007.</fn>

At the same time, chemical inventions drastically altered the profession of perfumery. The two key innovations included the serpentine cooling system in 1320 (with the production of high-grade alcohol), and the discovery of chemical synthesis (allowing for the controlled laboratory production and replication of known as well as entirely new scents). In turn, perfume manufacture began to alter radically at the dawn of the twentieth century when synthetic scents made their debut.<fnr46> Once the chemical composition of fragrance materials was identified by the end of the nineteenth century, active exploration of synthetic alternatives to raw and rare materials began. Earliest discoveries of the chemical composition of similar essential oils advanced with the improvement of techniques for the separation of different odor components from raw materials (such as vacuum-distillation and derivatization techniques).<fnr47> That allowed for the production of structurally similar derivatives from a chemical compound.<fn46>Ohloff et^^al., chapter 1.</fn><fn47>Dumas 1833.</fn>

Synthetics were born (Figure^^2<figr2><?><?>ok if reference is placed here?<?><?>). The synthesis of coumarin initialized this development. But the real revolution was the synthesis of vanillin from coniferyl alcohol.<fnr48> Several companies spawned that specialized in the production of synthetics, including the two firms dominating the global fragrance market today: Firmenich (formerly Chuit & Naef) and Givaudan in 1895.<fnr49><fn48>Tiemann and Haarmann 1874.</fn><fn49>Firmenich & Co. 1945; Champion et al. 2016.</fn>

Notably, this radical shift in the means of production caused an ontological change in the conceptualization of perfume as cultural artifacts. The impact of synthetics on perfumery is impossible to overstate. Fragrances no longer were mere alterations of natural objects. They became independent creations, representing a new art form. With the arrival of synthetics, a new material dimension of smells opened.<fnr50> Synthetics allowed perfumers to establish themselves as conceptual artists beyond the confines of nature’s palette.<fnr51> Simultaneously, synthetics catapulted perfumery into big business since it allowed for controlled and reproducible commodities.<fn50>Barwich 2020, chapter 1.</fn><fn51>Ellena 2011.</fn>

Has perfume manufacture changed since the synthetic revolution in the early 1900s? No.^^What did change was the cultural practice in the use of perfume.

Synthetics, and the liberation of the perfumer as an artist, is at the core of the cultural revolution of modern perfume. In the twentieth century, perfume turned into an intangible, sensory medium of fashion. It soon was defined more by custom than utility. More importantly, with its industrialization, perfume became a medium of popular expression, having become widely accessible and explicitly marketed to the masses.

This marketing is incredibly significant, since synthetics allow the smells chosen by perfumers to reflect a cultural or artistic choice, not only a material or economic one. Consider the case of *Amber Empire*, a 1927 perfume reformulated in 2015. The original 1927 *Amber Empire*, inspired by a Chinese snuffbox, was described as “as mysterious and refined as the ageless East.” The 2015 reformulation, however, was “cosmopolitan, contemporary and devilishly sensual,” with rich, earthy tones and hints of oolong tea.<fnr52> Both perfumes were meant to draw on the audience’s conceptions of the East, both shared the same name, but both had different formulas. In other words, the reformulation had the same goal as the original, but it was made with different scents. This is significant: the reformulation achieved (or attempted) the same intention as the original—to capture the “foreignness” of the East in Western imagination—but, chemically, it was not the same perfume. Thus, veridicality was eschewed in favor of another sort of authenticity: *representative authenticity*, or the kind of authenticity achieved when an artwork or performance conveys the same message to a different audience by altering its form. Regardless of its success, this reformulation may be considered an attempt at an authentic, but not veridical, *and yet still useful*, recreation of the original *Amber Empire* due to its attempt to mimic the original’s artistic goals. <fn52>Atkinson’s, “Amber Empire,” *Atkinsons1799.com*, https://www.atkinsons1799.com/collections/the-fragrance-collections/the-legendary-collection/amber-empire/ (accessed 30 May 2020).</fn>

That is why the historical analysis of a perfume requires explicit discussion concerning the methodology of the recreation as well as the methodology of the analysis itself. So what characterizes the *methodological* dimension regarding the experimental recreation of perfume in historical scholarship?

5. Outlook: An Epistemology of the Inconcrete

The sensory and performative nature of perfume forces historians to sacrifice a most prized idea of their discipline: the tracing of the origins of the present in veridical reconstructions of its past. Instead, historians must decide what kind of authenticity they want to emphasize in a given recreation: material, contextual/representational, or procedural/methodological<?><?>two different word types, noun and adjective, really intended here?<?><?> This need not be an exhaustive list. The point is that these different aims need not align or even result in similar enough products of recreation. For example, substitutions could be required because of the changing legal status or scarcity of raw materials. Meanwhile, contextual authenticity hinges more on an understanding of, for instance, cultural practice and the sensory dimension thereof than pure procedural copying. We also saw that reconstructions of a perfume inevitably results in an historical object in itself, and thus cannot be considered an exact replication but a recreation. Accordingly, the creation and subsequent analysis of such an artifact must be informed by the aims of recreation, determining what kind of knowledge the recreation offers.

Perfume notably shares this methodological outlook with other culturally significant practices that elude traditional understanding of historical objects. Consider dance and choreography, which necessitate a look beyond the orthodox methods of historical scholarship. On the subject of dance, the historian of choreography Franko thus argued to reverse the angle. Instead of trying “to evoke what no longer is, with the means of what is present,” he suggested to discover the new in the old as reinvention. “I regard reinvention as Mannerism, characterized by the fixation on precise stylistic aspects of a lost original work and guided by the reinterpretation of a period’s most characteristic aesthetic preoccupations.”<fnr53><fn53>Franko 1989, on 58.</fn>

This is a radical proposal. It implies to separate the sensory and performative effect of an artifact from its material representation and, to some extent, its historical context. What an experimental recreation of performative artifacts thus entails is an identification of qualitative analogues in style as patterns, or the lack thereof.

A clearer exposition of an experimental methodology for the historical study of performative artifacts must remain an insinuation at this point in time. Further empirical case studies with a wider variety of performative recreations and more rigorous documentation are needed first. This is after all an empirical issue. And so this article primarily pointed at a gap in the literature that needs rectification (but cannot yet be bridged given the constraints of its scope and lack of systematic data acquisition). Here we highlighted the benefits such rectification yields for historical scholarship in the study of culture and material practice, as well as reflections on methodology.

What the above examples of perfume recreations have shown is that traditional historical focus on objects and the codification of their representation excludes not only the sensory dimension of historical reality but likewise seems insufficient for the study of important parts of cultural practice. In closing, what the difficulties in perfume recreation demonstrates is a need to further empirical methodology as a vital part of contemporary historical scholarship. Of course, this cannot be a matter of historians alone. All recreations involve expertise of the gestural or tacit kind, which presents collaboration in a multi-disciplinary setting not simply as desirable but, in effect, inevitable.

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Figure^^2 Exemplary timeline of historical benchmark perfumes including their associated key discoveries in synthetic odorants design. Data from Ohloff et al. 2011, on 8--15.