

# Sensory Science in Tension: How Environmental Odour Sensing Involves Skills, Affects and Ethics

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## Abstract

For the last 15 years, sensory science has frequently been recommended to industrial actors to monitor odours, assess the quality of the environment and improve their factories' functioning. Resident "sniffing teams" have been put in place in different contexts to assess odorous pollution. These teams are groups of local residents living in the neighbourhoods of industrial facilities, who have been trained to report pollution emissions. This article describes these teams as sensory devices and argues that their functioning relies on the consent of the residents to allow themselves to "be affected differently" by smells – from annoyance to interest and curiosity about odour recognition and reporting activity. This consent, which is based on an 'ethic' of sensing, centered on the sniffers' own feelings, is delicate, tense and reversible, given the emotionally-loaded contexts of odorous pollution.

**Keywords:** olfaction, sniffing team, odour management, sensory science, citizen science

## Introduction

Over the past 15 years in France, measuring odours has become a requirement for any industrial plant whose activities generate foul-smelling emanations likely to strongly disturb the neighbourhood. Because of the absence of epidemiological surveys investigating the long term impact of gas emission on the health of local residents, the focus on smell has become a major factor in the social acceptance of industrial facilities. In view of the "discomfort" caused by these emanations, setting up 'resident sniffing teams' has been one of the managerial tools to comply with the odour-neutral standards (Charvolin et al., 2015; Rémy and Estades, 2007). These teams are groups of local residents living in the neighbourhood of industrial facilities, who have been trained to report odorous pollution emissions. Their increasing use

in environmental management corresponds, to a large extent, to the return of the sensorial in the monitoring of air pollution (Charvolin et al., 2015). Sniffing teams are appealing to managers and policy-makers not only because the measurement of odours is considered to be inseparable from individual perceptions, but also because they provide a participatory tool, in line with contemporary modes of public policy making (Blondiaux and Sintomer, 2002; Jasanoff, 2003; Lengwiler, 2008). Citizen participation in the observation of environmental realities is not a new idea<sup>1</sup>. In many domains, environmental data cannot be limited to technical instrumentation and modelling. Empiricism involves observations that scientists themselves cannot always make; it involves "lay" knowledge from the field, informed by realities

of proximity, that cannot be observed by more conventional measurement instruments. As Collins and Evans (2002) point out, studying this “lay” knowledge means emphasizing the experience of non-experts, in other words, the forms of “expertise” they have developed through their proximity to things, and the irreducible nature of their sensory experience of these things. In many fields, interest in these forms of knowledge has led to a streamlining of volunteers’ sensorial activity within environmental data collection organizations. These bodies represent a collective sensorial activity insofar as they organize, structure and streamline a surveillance across a territory. This vigilance is understood not only as the ability to capture the particular territory’s abnormalities, but also as a form of presence, an attention to the world, able to detect changes and transformations likely to affect the more or less negotiated modalities of collective living (Chateauraynaud, 1997). In that respect, these bodies correspond to organized sets of sensorial perceptions that identify the “relevant properties of the environment”, ensure “the shift from sensations to qualifications”, and provide “common affordances” for the phenomena (Bessy and Chateauraynaud, 1995: 292-306).

Recently some sociological and historical academic works have been published on the workings of sensory sciences involving olfaction and taste (Howes, 2015; Lahne, 2016; Muniesa and Trébuchet-Breitwiler, 2010; Phillips, 2016; Shapin, 2016; Teil, 1998). Despite the frequent association of olfaction with forms of “animality” or “savagery” (Classen et al., 1994), olfactory sensing remain an important cognitive social practice in modern societies. The sciences of sensory evaluation have commonly been used in the food industry, wine business or perfumery to assess the quality of food, objectify the value of wines or discern the composition of fragrances. They are often established in laboratory-type environments, where the conditions of sensing are controlled by the authority who manages the conditions of sensing. Most academic works have highlighted the delicate perceptual, cognitive and performative processes involved in these collective sensing activities; they can be highly relevant and useful to analyse how resident sniffing teams work in context. However, the particular affective situa-

tions in which these resident panels operate do address some very specific questions. Contrary to ‘classical’ sensory sciences, which are usually meant to address marketing concerns within relatively confined, context-free and de-personalized environments, resident sniffing teams are directly linked to the conflictual situation of nuisance and its regulation. The “open air” character of these sensory sciences therefore raises questions about the way in which this collective expertise is set up and develops over time, in regards to the emotional context of its emergence. Most of the panel members, who are daily asked to sense air quality, are indeed also affected by the nuisance. Neither the participant’s cognitive involvement in this sensorial activity, nor the overall technical and affective conditions of knowledge production, are trivial.

This article is an attempt to understand the social, technical and emotional processes of collective sensory sciences in the context of odorous pollution management. It builds on the affective turn in the social study of science that has recently highlighted the necessity to pay closer attention to the affects in the making of the social in general (Thrift, 2008; Wetherell, 2012) and the science in particular (de la Bellacasa, 2011; Kerr and Garforth, 2016; Latour, 2004a; Lorimer, 2008; Myers, 2008). The building of scientific knowledge does involve care, emotional interactions and affective practices, whether these practices are taking place in the lab (Kerr and Garforth, 2016; Myers, 2008) or on the field (Lorimer, 2008). This article first begins with a reflection on sniffing teams as environmental management instruments, addressing the issue of open air sensory science. The second part of this article gives a detailed analysis of sniffing teams in action, by focusing successively on the construction of the collective, the setting up of the olfactory language, the dynamics of odour reporting and the operativity of this sensory science. The final section of the article discusses the specificities of this field science and reflects on its potential contribution to a dialogue of affects.

## Sniffing teams as sensory science

### ***Sniffing teams to monitor environmental nuisances***

The increasing recourse to resident sniffing teams to monitor environmental pollution is partly due to the fact that measuring bad smells – and the discomfort that they bring into being – still remains problematic for industrial plants and for their neighbours who are dealing with atmospheric pollution. When objectifying odours, on the one hand, chemical analysis proves to be limited, since the complexity of odorous cocktails makes the analysis uncertain and unreliable. On the other hand, relying only on the neighbours “subjective” judgments is reckoned to be barely usable to organize a sincere dialogue between the two parties. Though the participation of people is increasingly promoted as a social norm, their assessments are constantly delegitimised and disqualified in conflictual situations. The idea of involving people living in the neighbourhood of industrial facilities in resident sniffing teams partly solves this issue of measuring smell. It takes into account the need to assess the quality of the odours (and the discomfort that they produce in the vicinity of industrial facilities) without disconnecting them from the sensorial entities from which the judgements originate. It provides a sensorial device, able to transform a set of subjective judgements into stronger objective statements (Shapin, 2012). This environmental management instrument has therefore little by little gained success within the industrial world. It has particularly seduced environmental experts who see in this device a collective, operational and controlled sensorial assessment tool capable of objectifying environmental annoyance. Different methods have been proposed to establish the team, describe the nature of odors and evaluate the degree of discomfort. Some scientists have proposed a method to estimate the level of annoyance felt by the members of the panel by developing a hedonic scale (Köster et al., 1985). Others have focused on the elaboration of an appropriate technique to depict the type of odors encountered in the environment and discern their origin (Jaubert et al., 1995; Suffet and Rosenfeld, 2007). These attempts to elaborate methodolo-

gies have influenced the local implementation of sniffing panels; more broadly, they have participated in the development of an already existing sensory science that goes far beyond the domain of nuisance management. Let’s now focus on the workings of these sensory sciences in action.

### ***Olfactory science and its affective background***

The academic works dealing with these sciences of sensory evaluation have revealed different aspects of the workings of sensory sciences in practice. First, the search for objectivity produces a need for sensorial languages so as to link each odour property with a commonly accepted qualification. The development of wine sensory evaluation in California in the mid-20th century, is an example of such olfactory language. It supposed the complex elaboration of a whole set of descriptors that hint at a genuine sensation, enable communication and represent an inner wine characteristic (Shapin, 2016). According to its conceivers, the invention of such language was a necessary step to countervail romantic and fanciful talk about wine. The same process of language building occurred in France with the elaboration of the ‘*Field of odours*’ olfactory language. This language (which has been used in very different domains including environmental pollution) has been analysed as an attempt to associate actual sensations with well identified molecular components that allow learning, comparability and communication among the “experts” (see Rémy and Estades, 2007; Teil, 1998). Second, the development of sensory devices also relies on managerial systems that aggregate and format the data. That is what Latour (1987) calls a ‘center of calculation’ that allows the manipulation of big numbers. In order to reach an acceptable level of “objectivity”, the observations are compiled and processed. The individual sensorial statements are subjected to statistical treatments so as to guarantee the significant character of the sample, minimize aberrant observations and put aside highly specific cases. The recourse to statistics helps “make the subjective objective” (Phillips, 2016: 471) so to speak. Third, the sensory device also entails, for the participants, the building of a perceptual capacity that not only consists in learning the language,

but also requires a genuine exposure to the smell, a real experiencing of the odour and an actual sensorial involvement. As Muniesa and Trébuchet-Breitwiller (2010: 334) posed it, regarding the perfume consumer testing groups: "This is not exactly about acting 'as a consumer'. It is rather about getting actively involved in the operation of making oneself fit for measurement", in other words "becoming a measuring instrument" (Muniesa and Trébuchet-Breitwiller, 2010: 334). However, learning to be "affected" doesn't only involve lining up for battle, and putting oneself in the skin of a cold operating measurement tool, like a robot. It involves being moved, put into motion, emotionally engaged in the process of learning, ready to engage emotionally with other entities<sup>2</sup> (Despret, 2004; Latour, 2004a). Taking the case of becoming a flavor expert in France, Genevieve Teil (1998) showed that olfactory recognition requires very intense bodily and emotional engagement and the ability to be fully stimulated by a new sensorial reality. It implies learning to become sensitive by developing a marked interest in exploratory work, likely to lead to new types of attachment to the world (Teil, 1998). In this process of attachment, the mind and the body are closely "articulated" (Latour, 2004a), and the practice of discriminating odours is enacted through the development of close relationships with techniques and artefacts of odour recognition.

### ***Sensing the odorous pollution as 'open air' sensory science***

If these attachment processes have been already described in the literature, one can distinguish differences in postures of affective engagement. Up until now, works on sensory devices have mainly underscored accounts of 'positive emotions,' in rather confined and controlled environments. Most sensory sciences have been developed within quasi-laboratories where the participants are expected to sensorially test objects and products. The participants are used as 'proxy' for consumer behaviour within confined and semi-controlled environments, where all the preparative work of the managers is to organize context-free settings and de-personalize as much as possible the conditions of sensing. According to Muniesa and Trébuchet-Breitwiller's (2010) analy-

sis, using the Deleuze's concept of 'simulacrum' (1990), these arrangements correspond less to the creation of fake truths, and are rather an attempt to foster a particular reality: that of the consumers not merely grasping the tastes, but also performing the preferences (Muniesa and Trébuchet-Breitwiller, 2010; Teil and Hennion, 2004). In these environments, the practical work of learning is driven by either a passion for odorous expertise and smell recognition virtuosity, or a basic involvement in a low remunerated activity of panel testing. It can provide the participant with an opening into a new aesthetic sense of olfactory reality, or a latent feeling of disenchantment provoked by the repetitiveness of the task.

As opposed to these quasi-lab simulacrum meant to understand, perform and shape consumers behaviours, resident sniffing teams encompass a different sensorial project. They derive from a 'field' or 'open air' (Callon, 2009) sensory science where reporting activity relies on a highly context-loaded environment. The sniffing panels are generally set up in areas where industrial actors receive recurrent complaints about pollution and sniffing teams are directly involved in the conflictual contexts for which they have been set up. Odour recordings are sent to the plant manager (or to an external consultant on behalf of the manager) who compiles the data, which is then presented publically in deliberative arenas. This proximity between the political-managerial context and the perceptual device has two implications on the sensory activity. First, the conflictual situation, as a specific affective context, can obviously impact the shape of the sensory device. Since most of the volunteers are also residents caught in a situation of conflict and dealing with the nuisances in their day-to-day lives, the way they relate to sensorial involvement can be problematic. They must not only technically identify a smell, but also contribute to identifying a reprovved entity and the sense of disgust experienced when faced with this intrusion. In other words, their involvement in a sniffing team could appear to be counter-intuitive, as it means learning to become sensitive to variations that one would likely prefer to ignore or to denounce. Second, the sensory devices can also affect (or perform) the conflictual context. Resident sniffing

teams are explicitly geared towards enabling cohabitation between an industrial actor and its neighbours. They almost instantly position the “experiences of non-experts” within the timeframe of participatory political decisions. Sniffing teams can therefore have direct consequences on public decision making: they are directly operational in a management context; they equip public policy and structure local dialogue and decision-making processes.

The practical singularities of resident sniffing teams address the issue of the affective workings of this sensory science in context. Although some authors have already underlined the dynamics of knowledge and know-how acquisition specific to sniffing team devices in nuisance management contexts (Charvolin et al., 2015; Rémy and Estades, 2007), less attention has been paid to the specific affective dimensions of these processes<sup>3</sup>. How do the volunteers get involved in the sensorial and cognitive process? How do they work backwards to reverse their emotional perspective from disgust to interest in variations, and from somatic rejection to sensorial curiosity? How do they cope with a cognitive process whose results are likely to affect the direct outcome of the conflictual situation? What are the effects of these environmental monitoring tools on the evolution of the conflictual situations? The rest of this article will shed some light on the above mentioned dimensions.

### **Method**

In order to fully grasp the specific nature of the sniffers’ collective perceptual activity, I chose to investigate sniffing teams at work. By ‘resident sniffing teams’ I mean ad hoc organizations set up to monitor the impact of an industrial plant on the immediate neighbours’ environment<sup>4</sup>. The analysis focuses on two devices put in place in response to domestic waste treatment biogas production plants being opened in urban areas in France. One of the cases took place in Saint Barthélémy d’Anjou and the other, in Montpellier. In both cases, the plants were set up by local authorities and specialized private operators ensured their day-to-day operation. They both caused odorous nuisance from the outset. Due to the regulatory obligations regarding the monitoring of odours

pollution, odour observation devices, including resident participation, were put in place. Third-party actors specialized in olfactory pollution management and/or resident consultation were involved in setting up these teams<sup>5</sup>. Ten to fifteen people were recruited in each case and were asked for weekly reports of nuisance episodes.

This study is mainly based on a series of interviews held in 2013 with the main actors concerned with the creation of these sniffing teams. A total of nine members of the resident sniffing teams were interviewed during the survey. The objective was to highlight the process of “enskilment” (Ingold, 2000) specific to odour identification, the “embodied practices” of the members regarding the smell recognition and their day-to-day activity of reporting. A pragmatic approach to “affective practices” was adopted so as to describe emotional subjectivities and mundane affects (Kerr and Garforth, 2016; Wetherell, 2012) involved in the sensory device. The experts that provided all or part of the methods (odour recognition training) were also interviewed so as to better highlight the learning process behind the acquisition of smell recognition skills, and more specifically the cognitive and managerial framework they implemented. At last, some additional interviews were conducted among a variety of local actors to understand the influence of the affective context on the sniffing team, and the effects of the reporting practices on the conflictual situation. Interviews were held with the authorities organizing public services to manage domestic waste<sup>6</sup>, the companies running the plants, the resident associations opposing the plants, the organizations responsible for the mediation process<sup>7</sup>, and the governmental services in charge of applying regulations to industrial facilities<sup>8</sup>. By comparing the testimonies provided during this study, I was able to retrace the central logic underlying the construction and functioning of these organizations. The analysis of the two case studies, presented below, draws on the results of this research. It focuses on the process underpinning the construction of the resident sniffing collective, the dynamics of establishing olfactory language, the daily work to report odours, and the impact of this olfactory monitoring on the political and technical context in which the plants were



launched. In this article, as I sought to highlight the processes common to both cases, I opted for a joint presentation of the results.

## Sniffing teams in context

### *Building up the collective*

The story of the creation of these teams begins with the recruitment of their members. The construction of the sniffing collective cannot be grasped without taking into consideration the conflictual context in which the plant was set up. In both cases studied, residents were made aware of the sniffing team project via word of mouth and at informational meetings. Most participants were inhabitants of the residential areas around the plant. The underlying rationale behind their volunteering was closely linked to their position as affected residents. Yet this involvement was in no way a straightforward choice. Some residents, though affected by the nuisance, preferred not to get involved, due to a lack of time or availability. Others sometimes showed resistance or even categorically refused to participate. In conflictual contexts like these, prior incidents can produce defiance among actors, and attempts to reopen dialogue can prove to be laborious. Some residents, described as “implacable” by the consultants or organizers, simply refused to take part in this “masquerade”, in their eyes a senseless effort to measure something that was obvious. These individuals felt affected by the nuisance but resisted any possibility of cooperation and dialogue with those responsible for their misfortune. They preferred ironic detachment to participation (Barbier, 2005).

The direct link with the nuisance suffered was not the only reason residents became involved. Recruitment was also informed by different actors’ desires to control the composition of the collective. For the associations of residents affected by the nuisance, mobilizing their members was a way to extend their action and local protest. Those that wished to be represented, therefore, naturally shared the invitation to join the sniffing teams with other members and sympathizers. For public authorities concerned with the long-term implications of this type of device, the significance of soliciting residents was very different. The

authorities were both anxious about the media impact of the measurement device (the risk that the nuisance might spread beyond the restricted circle of the actors of the conflict) and about the consequences of recruitment exclusively focusing on the residents “concerned” (problems regarding the “reliability” of the individuals recruited by local resident associations, suspected of “falsifying” reports). In Montpellier, the authorities chose to remedy these uncertainties both by limiting the size of the sniffing team, and by broadening active recruitment to residents who were not necessarily involved in the resident associative movement. The aim was to control the relative uncertainty surrounding the supposedly “subjective” nature of individual statements. The composition of the team thus gave rise to underground work to mobilize “allies”, people “of trust” whose objectivity “was not doubted”. This was the case of the following participant who, out of solidarity with the local branch of his political party, agreed to get involved in the initiative.

And in terms of what you’re interested in, I guess the reason I found myself responding to this study that was carried out, is simply that I gradually became involved in political life [...]. And the branch secretary, who was a town councillor, asked me if I would agree to take part in this study. Because I supposed he had been asked about people he knew... but he’d obviously been asked about people who lived very close to the neighbourhood, in other words not too far from that area. [...] And he asked at least five or six of us and I think we almost all agreed. (Resident)

### *Setting up the olfactory language*

Once the sniffing team members had been recruited, odours had to be qualified and consensus reached on individuals’ sensory experiences. Qualifying smell and discomfort involved setting up a shared frame of reference, a real “olfactory language” for all members of the team to be able to agree on individual experiences. This language was proposed to the sniffers during site visits and half day training sessions. In these sessions volunteers were presented with odorous flasks, true boundary objects allowing for the different actors to describe smells collectively. These were identified, named and differentiated. Members

of the team tested, validated and learned the correspondence between odorous composites and qualifiers. The different categories of smells identified were mapped onto the reporting frameworks, with their levels of intensity (very mild, mild, average, strong, and very strong) and discomfort (no discomfort, a little discomfort, discomfort, extreme discomfort). The monitoring not only examined odours, but also individual experiences, in other words, the emotional discharges caused by each odorous episode. The organizers proposed objectivizing both the object-odour and the subject-mood.

The qualifiers used to describe sets of odours were relatively simple for the most part, borrowed from common language: smell of fresh refuse, of fermented bins, of compost, of slurry, of manure, etc. These categories coexisted with more technical expressions: smell of BRS<sup>9</sup>, of alcohol fermentation, of biogas, of biofilter, etc. Some of the qualifiers used came from the residents themselves or were derived from local names and designations. The correspondence system between odorous composites and qualifiers could thus be tailored to the local context based on vernacular descriptors.

Locally, we adapted to the context... Personally I'm very attentive to the way people describe smells. Because there are several words for a smell. Take rank for example. One can say that it smells rank, but one could also say it smells like vomit. Here for example at one point someone described a kind of sweet smell as a smell of cheap wine. I don't know whether I wrote down cheap wine or not but I like using people's local descriptors. (Consultant)

These localized olfactory language had the advantage of being directly and rapidly operational. They required relatively little cognitive investment. Training time was very short and descriptors were unsophisticated<sup>10</sup>. Involvement in the training ideally brought about a shift in a team member's state of mind: from discomfort to curiosity about odours, from disgust to interest in variations, from defiance to participation. They had to consent to be affected differently by the smell. This shift was not a foregone conclusion. The cognitive dynamics could still be disrupted. First, the training was not systematically attended

by all members of the teams. Some team members lacked the time and availability to participate, while others did not see the point. Although team members had agreed to join the sniffing teams, some saw odour recognition more as an exercise in style than as a real necessity. Distinguishing between fetid smells was not a priority. What mattered for them, rather, was the discomfort suffered, irrespective of the type of smell identified. As one participant pointed out: "When it stinks, it stinks!" For these sniffers, the sophistication of identification methods was incidental; they thought it useless<sup>11</sup>. For them, learning smells was something intuitive and natural that came with experience and did not require specific training. As one of the sniffing team members put it, "the nose trains itself". Moreover, the learning itself was not infallible. Sniffers needed to learn to integrate the smells and their correspondences. For some of them, however, odours remained difficult to distinguish, and confusion was still possible. They needed to be able to retrieve the olfactory experience from their training, achieved with the odorous flasks and the odours smelled during the visit, and to associate these sensorial memories with immediate feelings in situations of discomfort. Some residents doubted their memory's capacity to make that association, and to repeat it over time, for it to become automatic.

I can smell the compost clearly, but with BRS and biogas, those are two different smells and I mix them up a little. [...] Compost has quite a particular smell. For me it's not a sickening smell. But smells are [...] a bit like driving a car. When you go one or two months without a car, suddenly there's ... it's not long but it's a bit less automatic than when you drive your car every day. It's kind of the same for smells I think. There are automatic reflexes. (Resident)

Memory erosion can gradually weaken this automatism. After a lapse in exposure, some sniffers could lose their precision, and the description, as it had been formulated during the training sessions, no longer seemed so clear. It thus became necessary for participants to maintain their olfactory capacities, to "put [the smells] back in [their] noses", as one resident put it. Some extra-training sessions or site visits were organized for the panel

members to review the correspondences and refresh their olfactory memory.

### **Reporting the odours**

The next step consisted in the daily work of noting episodes of odours and reporting them. The work carried out by resident sniffers to report smells, their intensity and the level of discomfort caused, was integrated into forms of routine that rendered reporting operational in everyday life. The members of the sniffing teams made organizational efforts to facilitate reporting: buying IT equipment, having a summary sheet easily accessible, sharing reports with a family member in charge of transmitting them to the plant, etc. All these arrangements within households made the framework ergonomic in everyday life. The sniffing team members' motivation was based on their ability to integrate reporting in these micro-organizations. These organizations nevertheless remained fragile and could potentially be challenged. First, the individual sensitivity considerably impacted the act of reporting. Although the team members' olfactory capacities were operational, as they had been tested and validated, the sniffers themselves acknowledged a significant disparity in this respect. Some team members were identified as rather insensitive sniffers who never reported odours, while others, on the contrary, were seen as unflinching. This wide difference in sensitivity was characterized not only by variations in terms of individual olfactory reactions (mentioned by the individuals themselves), but also by differences in the emotional reactions (repulsion, stress) triggered by the appearance of the smell. As explained by one of the protagonists, reporting is highly dependent on the odour "tolerance threshold"; it occurs not necessarily when the smell is perceived, but rather when it "hits".

In any case it's always the same. When it doesn't smell, you don't realise it. You don't think about it. You don't know that it's there. It's when it hits you and that it happens in a negative way, that's when you think "wow it's true, that's what it is". And that's when you tick the box. [...] for example, some people say: "I can stand it [the smell]" and I tell them: "but I can't". They can stand it. At the end of the day, the tolerance threshold is like with pain, we're not equal. (Resident)

These dynamics considerably challenged the common representation of reporting, that is, the supposed relatively linear appearance-reporting mechanism (the smell triggers reporting). While it is the emotion felt that is reported, its trigger has to be disconnected from this emotion (particularly to be able to identify odour episodes that cause little discomfort). In practice, this stimulus-response perspective was challenged by the individual "sensitivities" of the team members.

Second, the routines in place could also be easily disrupted when obstacles arose. For example, in the case of Saint Barthélémy, the text message reporting system was almost stopped when the members of the team realized that they were paying a surcharge to send their reports via text message. More generally, the long-term participation in the devices was a real challenge. It could easily be lived as a source of irritation, with the constant attention to the odours as an additional "nuisance". Not only did sniffer team members have to suffer from the plant, but they also had to cope with this constraining exercise of counting and reporting, forcing them to pay daily attention to some disturbing elements that some would otherwise rather have tried to ignore. The feeling of being disturbed is a circular, self-generative process in which attention plays a role (Colon, 2012). In this process, by artificially maintaining their attention, team members could magnify feelings of irritation or provoke weariness, negligence, or sometimes withdrawal. Thus the sniffer's decisions to report relied on a delicate balance between engagement, routines, irritation, and self defence mechanisms. The level of assiduity among the members of the panel was subject to variations in accordance with the local context; peaks of odour episodes were often observed after new developments in the conflict between inhabitants and industrial facilities. For example, the release of a report indicating a significant reduction of odorous emissions often revived sniffers' attention. In most cases, however, the managers in charge of collecting the reports were facing problems of constancy and assiduity. They relentlessly sent reminders to the sniffers to make sure that they were continuously alert, and to maintain the actual affective involvement of the panel members. This reminding activity worked as genuine emotional labor (Hochschild, 1979).



### ***The device's ambivalent operativity***

As I have just shown, sniffing teams as sensory science increase their objectivity with different cognitive, social and affective practices. These include i) orienting the recruitment process to guarantee an affectively 'balanced' panel composition, ii) sensitizing, testing and training the sniffers' olfactory organs to make the olfactory language effective, and iii) maintaining the constant attachment to the device by encouraging assiduity. The analysis of this process of making the subjective objective also shows that the workings of this sensory device deal with many areas of uncertainty: the participant's olfactory memory is likely to erode; the routine, underpinning the acts of reporting, can fluctuate in space and time; and the long-term existence of the panel can thus be challenged by phenomenon of weariness and disengagement. Despite these uncertainties, the sniffing team devices prove their operativity in the field. In both cases studied, the tool was unanimously recognized by all the actors involved. The nuisance was mapped, recorded over time and politicized, insofar as the results of the odour diagnosis were seen by the different actors, presented in local consultation bodies, and used as a reference during discussions<sup>12</sup>. The results also had some technical implications since the experts could trace the types of odorous emissions back to specific components of the technological process. The device is, in this sense, "performative", as it gives odours a technical, institutional and political existence, and lends "visibility" to the discomfort, beyond the restricted circle of local protest. This performative process is not just a minor issue. In both cases, considerable additional resources were allocated to contain the smells<sup>13</sup>.

However, the device itself does not unavoidably reduce tensions between the industrial polluting plants and its unhappy neighbours. In the two situations I studied in 2013, despite the frequent drop in the appearance of odours (measured by the sniffers), the level of discontent (measured during the interviews) was still as high among the most affected residents. In the two cases, local resident organizations (which had both come into being after the first odorous episodes) remained very unsatisfied with the odorous situation. As one such resident bitterly pointed out: "they [the

organizers] are happy with themselves because they say that people complain less. [...] There was total self-satisfaction at the meeting before last because there were [allegedly] no more complaints." This tense situation reveals a different way of assessing the odorous state of the site and of interpreting the data produced by the team. On the one hand, the plant actors (i.e. the local authorities in charge of the waste management public service and the private companies running the plants) considered the odorous situation to be considerably improved after several years of odorous monitoring. They based their judgements on the "objective" measurements (mainly focused on describing trends in discomfort indexes based on the frequency of appearance) that seemed to deliver an absolute verdict on a site's odorous state. The situation was said to be satisfactory if the frequencies of odour appearance did not exceed the thresholds set out by French regulations<sup>14</sup>. On the other hand, local resident organizations saw this frequency measurement as over-simplified and unsatisfactory. The statistics and numbers presented during the different concertation meetings were not regarded as reflecting the discomfort that they deeply felt. The discomfort was experienced as being just as present even if the frequencies had dropped; all nauseating intrusions were considered intolerable.

Due to these divergences, tensions could very quickly shift to the field of the device itself. It could then be discredited when the results of the diagnosis did not correspond to expectation. The different actors each tried to attribute the nuisance evaluation, deemed unsatisfactory, to imprecisions and uncertainties in the device. Both sides were critical: with one side emphasising the risk of reporting over-estimation, while the other side denounced the eventual phenomenon of under-estimation. The plant actors mainly underlined the peaks of odour reporting after a special event took place, thereby artificially inflating the numbers. They implicitly distrusted the integrity of the panel members who they suspected insincerely boosted their reporting. The resident organizations, for their part, emphasised the many potential sources of discomfort under-evaluation. Differences in sensitivity between the members of the team were denounced as an unjustified

source of uncertainty and variability. The erosion of olfactory memory was also identified as a source of imprecise reporting, and therefore as the device's operative flaw. The sniffers' lack of assiduity, suspected of affecting the statistics, was also denounced as it could also result in an under-evaluation of the nuisance. And finally, the targeted recruitment was challenged, described as "non-objective" and suspected of biasing the reports. These various criticisms, and attempts to disqualify its reliability, put a serious strain on the device. The persistence of the discomfort, or simply growing weariness, eventually eroded some sniffers' involvement.

### **A sensory science in tension**

As this article shows, sniffing teams present the characteristics of a fully-fledged citizen field science. They are comprised of: volunteer sniffers who perform regular recordings, the true kingpin of collection work; a set of codes and conventions to harmonize reports; managerial supervision, the computation centre gathering all the observations and formatting the information; and boundary objects, the odorous flasks, the mobilizing entities around which all the actors coordinate themselves to evaluate the inconvenience experienced. They experience uncertainties, imperfections and critiques, while coping with strong affects that deeply impact the counting and calculating processes. Several lessons can be learned from this survey.

#### ***The consent to be affected differently***

First of all, the enskilment process is a delicate one. It obviously requires a direct sensorial contact with the odours since written descriptions alone are insufficient to acquire the keys of smell recognition; olfactive knowledge and know-how are based on sensorial practices and shared experiences (Candau, 2000, 2004; Candau and Jean-jean, 2006). But the additional difficulty regarding this learning process is that the members of the sniffing teams have to radically change their mind set. This change means a total re-aligning of their body and olfactive skills with those of odour experts, a greater inclination to care for variations and nuances, and to build up an encyclopedic

knowledge of smells and tastes (Teil, 1998). This disposition depends upon an affective shift, that is the 'consent to be affected differently'. Despite the discomfort, anxiety and anger that the sniffers might experience as residents, they have to leave these emotions behind for a while to entirely step into the learning process. This is not an easy step to take. Resident sniffing teams display mitigated forms of volunteer involvement in the device. Where sensory sciences draw mostly on the figure of the virtuosity of the amateur, the character of resident sniffers' engagement is entirely different. Most of the members don't sign up for their own personal enjoyment. They do it with the hope that the situation will improve, that the quality of their living environment will get better. When residents do agree to participate, their involvement is associated primarily with necessity, with a will to extend denunciation or to express solidarity with either one of the actors of the conflict. For this reason, sniffers' choice of cognitive engagement is not self-evident. Some participants stay away from the device by not attending training sessions, while others challenge the system of olfactory descriptors, which they see as disproportionately sophisticated and refined. Given these uncertain forms of cognitive engagement, the olfactory languages put in place are tailored locally and remain relatively simple to use. Their elaboration, based on local 'lay' categories, differs from the common representation of slowly built sensorial devices specific to sensory sciences. Certainly, the construction of these sensory sciences languages does involve volunteers and civil society actors, but it ultimately leads to a relatively centralized and universal normative framework. By contrast, for operational reasons, in practice the resident sniffing team recognition patterns remain highly tailored to local nuisance contexts. Because of the rather delicate affective context, the consent to learn a more sophisticated language remains problematic – despite some experts' efforts to institute a more complex universal olfactory language<sup>15</sup>.

#### ***The interplay of the emotional context***

Emotions not only inhabit the enskilment process, they also colonise the day-to-day functioning of the device, the daily recording work *per se*

in particular. The data collection activity (odour reporting) is challenged by differences in sensitivity among participants. Sensorial capacities are often the main reason claimed to explain differences of reporting. This survey shows however that the logics of reporting are also embedded with emotions. First, individuals can be affected differently by smells, and the logics of odour reporting can be much more shaped by a 'tolerance threshold' being crossed, than by a continuous and demanding attention to odours. The individual ethic of field science is, for some sniffers, overpowered by their negative emotions in context. Their reporting dynamics are influenced by their affective releases. This phenomenon shows the difficulty for the sniffers to maintain a constant attention to an unpleasant element of their living environment. Not only do they suffer from the nuisance, but they are also compelled to report it. They can't employ a simple, ordinary defensive mechanism, and merely ignore the odours. The lack of constancy and assiduousness probably has a lot to do with this long-term demanding attention. Second, the micro decisions to report can strongly be influenced by the evolution of the local context (conflictual events which revive sniffers' attention, collective reminders to report more frequently...). Flows of odour reports also follow the developments of local "affective communities" (Rosenwein, 2006) which, in turn, shape the actual dynamic of reporting.

The strong interplay of affects on the ethics of participation considerably challenges the sniffing teams. The participatory device is constantly questioned regarding uncertainties, incompleteness, objectivity and neutrality. The anticipation of affective bias can consequently push some actors to meticulously negotiate the implementation of the sniffing team so as to control the cognitive process. That is what occurred in Montpellier. The process of setting up sniffing teams shows very clearly that one of the issues for the actors of the conflict was maintaining control over the composition of the collective – particularly through targeted recruitment and the search for potential allies willing to become involved in the device. This dynamic reveals a strategic process intrinsically linked to the conflictual context, whereby the actors see objectivity as the result of a search

for a "balanced" team composition. It fundamentally differs from a more traditional perspective which sees the composition of the collective as driven more by issues surrounding participants' geographical distribution or the statistical significance of the number of observers involved. In the case of sniffing teams, it is the symmetrical nature of the "representation" of the different stakeholders within the collective – in the political sense of the term – that matters.

### ***Inscribing affects in a territory***

Despite all these apparent approximations, imprecisions and lacks of transparency in their implementation, the sniffing teams do leave their mark within their specific contexts. They succeed in inscribing odours and affects in the local technical, social and political processes. They do convert perceptions and emotions into textual and numbered references. Although their olfactory language is simplistic, unsophisticated, even limited, it proves to be adapted to these local situations. Sniffing teams "perform" the realities of nuisance by giving the odours an existence in the local political and institutional arenas. However, this ontology of smells experiences rather challenging issues. First, the inscriptions produced by the sniffing teams need to be "translated", – according to Callon (1986) – into affects so that the local community of actors do deeply feel the extent of the affects. To that end, sniffers' inscriptions sometimes fail to put enough emphasis on the actual state of the experienced emotional landscape. This brings to light the difficulty of representing affect intensity in written forms (Thrift, 2000, 2008) or standards. Second, volunteers can easily withdraw their involvement, which is implicitly determined by the improvement of the nuisance situation in the (relatively) short term. The issue of disengagement here is therefore not solely linked to the routine nature of observation work, the disenchantment brought on by streamlining records and the associated loss of meaning. It is also due to the irritating artificial maintenance of attention on the nuisance, which, over time, can demotivate the participants. Third, the device is likely to be readily criticized and discredited. In case of disagreement, the constructed objectivity of the device and the legitimacy of the figures

can be challenged by the volunteers themselves. The maintenance of perceptual activity over time is therefore highly dependent on the evolution of both the nuisance and the conflictual context. This type of field science device relies on a very fragile balance.

### ***Towards a dialogue of affects***

To conclude, I would like to underline the role of affects in sensory science. This article hopes to contribute to a better understanding of the role of emotions/affects in the making of sensory expertise. Emotions matter in the making of scientific knowledge, especially in the context of an 'open air' science that requires the full corporal and sensorial involvement of lay participants (Lorimer, 2008). This is even more true when, as in the case of sniffing teams, the pursuit of knowledge relies on the senses of these participants. The participants need to develop an 'ethic' of sensing, centered on the sniffers' own feeling rather than an ethical sensibility oriented towards environmental non-human beings<sup>16</sup>. This ethic brings to the fore the affective inner states of the sniffers (and of those that they 'represent', that is, the residents who don't participate in the sniffing team). This process is not one of, as Deleuze and Guattari<sup>17</sup> (1987) propose, 'becoming-animal', but rather a process of 'becoming-aware-of-oneself', of being observant not only of the odorous qualities of the environment, but also of one's own reactions and emotions. Despite critiques, uncertainties, and other issues regarding 'objectivity', the development of this sensibility does produce a local affective ontology. Sniffing teams allow the nuisance to exist within the institutional procedures; thereby contributing to intersubjective interactions, emotional interplay, a 'dialogue of affects' between the plant actors, the public decision-makers and the local residents.

This ideal of inter-affective communication extends the issue of democratizing technology and science, already described by several authors (Callon, 2009; Latour, 2004b), to the domain of emotions and affects. From the origin of industrial development, science and technology have created noise, visual or odorous pollution, eliciting the affects of people (Bonneuil and Fressoz, 2016; Corbin, 1986). The public expressions of these affects were mostly achieved by means of official complaints that sometimes resulted in *ad hoc* discussions between the different parties, discussions whose outcomes often favoured an industrial *laissez-faire* (Bonnaud and Martinais, 2005; Massard-Guilbaud, 1999). Expressing these emotions by means of participatory tools such as resident sniffing teams is a new step in this dialogue of affects. It embodies a managerial 'promise' through which the development of cities, industries and infrastructures not only takes into consideration potential consequences on the environment and health of people, but further takes into account their sensorial and affective living environments. This project of democratizing sensibilities relies on human participation because it allows a direct access to their subjectivities. Moreover, it produces a usable, 'objective' knowledge which can envision a more sensorial manner to organize the future sociotechnical assemblages. However, this promise remains a challenge for policy-makers, managers, industries. As this article has shown, sniffing teams are facing real tensions in their creation, workings and perpetuation through time. In particular, the social, corporal, sensorial engagement of residents remains fragile and reversible. The constant, regular and demanding attention underlying the development of an ethical, corporal, self-centered sensibility, can also – and paradoxically – become an additional source of disturbance for them.

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## Notes

- 1 It is found, in particular, in the construction of ecological knowledge, which for many years has used field volunteers to produce data on the animal and plant species present in an area. With the rapid increase of environmental management policies, sciences involving citizen participation have become widespread. Some record biodiversity (Alphandéry and Fortier, 2011; Charvolin et al., 2007; Ellis and Waterton, 2004; Law and Lynch, 1988; Lawrence, 2006, 2010; Lawrence and Turnhout, 2010), others identify phenological changes (Lawrence, 2009), monitor climate trends (Capel, 2009), or track all types of pollution (Charvolin et al., 2015; Chateauraynaud and Debaz, 2013; Yearley, 2006). In all cases, recourse to these “participatory” or “citizen” sciences (Irwin, 1995) is tending to prevail as a key form of collective expertise on the environment.
- 2 As Latour stressed, “If you are not engaged in this learning you become insensitive, dumb, you drop dead” (Latour, 2004a: 205)
- 3 The field of research opened by Rémy and Estades (2007) is far from being exhausted. First, their work on sniffing teams concerns a method that draws on a highly elaborate olfactory language (the Field of Odours method) which is actually not very widespread in the field of nuisance management. Second, this method does not take into account the measurement of “discomfort”, unlike the other methods encountered.
- 4 They differ from observation networks that have a much broader monitoring area, such as the volunteer sniffing networks that have been set up in Lyon for instance (Charvolin et al., 2015; Roussel and Schmitt, 2004).
- 5 In the case of Saint Barthélémy d’Anjou, a consultancy specialized in environmental mediation was tasked with organizing the public’s participation; a monitoring group called “sentinel” was put together to report any odorous episode via text message. A different consultancy specialized in olfactory nuisance management was then appointed to set up a digital reporting interface. In Montpellier, the organization of the resident sniffing team was entrusted to an *Association Agréée de Surveillance de la Qualité de l’Air* (AASQA, air quality monitoring association).
- 6 In reality, due to the conflictual nature of the industrial situations studied, only one of the two local authorities supporting the project agreed to meet me (in Saint Barthélémy d’Anjou).
- 7 These are the consultancies specialized in environmental mediation, and the AASQA, which also prescribes methods.
- 8 These are the *directions régionales de l’environnement, de l’aménagement et du logement* (DREAL, regional environmental, urban planning and housing directorate).
- 9 “BRS” accounts for “Stabilizing bioreactor”. It is a cylindrical container in which domestic waste is prepared for a few days before going into a digester that produces biogas.
- 10 As a comparison, the Field of Odors method, the implementation of which has been studied by Teil (1998) and Rémy and Estades (2007), involves learning some 40 “odorous notes”, requiring a little over 70 hours of training.
- 11 The same phenomenon was observed among the sewer workers of Montpellier. While professionalisation discourses tend to introduce new ways to talk about smells from 1990s onwards, the sewer workers refused to use these technical denominations that acted as euphemisms for their own particularly difficult daily labour conditions. They preferred using their own vocabulary, crude and direct, to talk about the violence of the smells, the disgust that it produced in their bodies, and the ordinary stupor that they had to cope with while working with excrements (Jeanjean, 1999).
- 12 In this case, it was the *Commission de Suivi de Site*, local arenas where the results are published for the public.

- 13 In Saint Barthélémy d'Anjou, the plant was even closed in 2015. One of the reasons contributing to its closure was a strong odour persistence, particularly inside the plant.
- 14 In line with French regulations regarding such waste treatment plants, odorous episodes must not exceed 175 hours per year (about 2% of the time). In Montpellier, this level was reduced to 44 hours per year (close to 0.5% of the time), due to the almost immediate proximity with the inhabitants of the area.
- 15 The invention of the Field of Odours is an attempt to create such a universal olfactory language (Jaubert et al., 1995). But since the training process is very demanding, many experts consider the method not to be suited to the management of conflictual situations.
- 16 In the case of research in molecular biology, Myers for instance describes a feeling that the scientists have for the molecules to describe their attachment to their object of research (quoted in de la Bellacasa, 2011; Myers, 2008)
- 17 The learning and acquisition of recognition skills has been described by Deleuze and Guattari (1987) as an emotional process binding together human and non-human entities, a process of "becoming-animal".