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## **Sensate Regimes of War: Smell, Tracing and Violence**

### Abstract

This article explores the fabrication of ‘sensate regimes of war’, concentrating on the typically under-analysed sense of smell. Smell is a sensory mode capable of apprehending potential threat and enmity in ways that are orthogonal to other ways of sensing. Accordingly, the organization and interpretation of olfactory sensation occupies a distinctive place in war. The article details a particular genealogy of martial olfaction, exploring the olfactory capacities of soldiers and their augmentation through various non-human and technological means in specific milieus of combat. It notes how the distinctive affordances of smell have underpinned numerous wartime practices, from tracing improvised explosive devices to militarized manhunting. These developments supplement and trouble ocularcentric accounts of martial sensation and power that concentrate on the increasingly abstracted co-production of vision and violence in wartime. They highlight rather the significance of an alternative ontology of the signature or trace of enmity, and emphasize how in particular warscapes to smell is to kill. The article concludes by arguing that critical inquiry into war would benefit from a broader theorization of all its sensate regimes right across a sensorium that is itself being continuously transformed through war.

### Keywords

Sensate regimes, senses, smell, trace, violence, war, atmosphere

You can't explain what war really is to someone who has never been there .. they simply don't have the necessary sensory organs.

(Arkady Babchenko, *One Soldier's War in Chechnya*, 2007: 398-399)

### Introduction

This paper explores how wars are entangled with the making and unmaking of particular regimes of sensory apprehension. War is a crucible of sensory experience that radically alters ways of being and sensing in the world. Joanna Bourke claims that 'From the moment war is declared, the sensual worlds of all protagonists are marshalled to the cause' (2017: 375). I will argue here that it is not simply the marshalling of pre-existing and stable sensual worlds that occurs in wartime. Rather, sensory capacities become transformed and attuned to various aims and objectives. These range from the tracing and destruction of the enemy to the exigencies of personal survival, depending on one's particular positioning in the 'war matrix' (Jabri 2010). Furthermore, the particular sensory capacities, attunements and regimes that are forged in the crucible of war are often durable and have resonances that constitute longstanding sensory inheritances and significant genealogies of sensation.

It's important to state at the beginning that there is no such thing as raw sensation – particular bodily ways of knowing and sensory experiences always emerge and are developed within specific environments and social worlds, are made culturally and politically meaningful, and become enlivened through particular material and media assemblages. For example, in a discussion of the spectatorship of war photography, Judith Butler suggests that such visual framings may 'prepare us for war, even enlist us in war, at the level of the senses, establishing a *sensate regime of war*.' (Butler, 2012: 110, *my italics*). Butler's phrase is suggestive but not further elaborated and I use it here purely as a sensitising concept. In this paper I thus define and explore sensate regimes of war more specifically in terms of *the transformation and fabrication of ways of sensing in the preparation, prosecution and aftermaths of war*.

Whilst much scholarship has explored the co-production of vision and violence in wartime, exploring the logistics of perception, 'scopic regimes' and the sociotechnical development of the martial gaze (e.g. Bousquet 2019; Stahl 2018; Virilio 1989), work on the other senses and

war is still largely noticeable by its absence<sup>1</sup>. As such, this paper will concentrate on trying to trace some of the multiple imbrications of another crucial sensory way of knowing - that of smell - with war. The paper argues that the sense of smell, or olfaction, is a significant but nonetheless largely under-researched and under-theorised topic when analysing the experiences and practices of war. People, communities and militaries develop a nose for war, for hints of wartime threat and enmity in particular. And smells transform those bodies as they develop a nose, as famously depicted in *Apocalypse Now* when Roberts Duvall's character Lieutenant Colonel Kilgore asserts his love for the 'smell of napalm in the morning'.

The paper is organised as follows. In the next section, I briefly explore some reasons why the topic of smell and war remains under-analysed, why there is a relative paucity of theoretical resources with which to think this linkage and some of the empirical difficulties in researching the topic. The following four sections then trace a particular genealogy of various olfactory regimes of war. I firstly explore the olfactory capacities of soldiers, their engagement in practices of smell discipline and camouflage, and how their interpretation of wartime smells often reinforces a wider discursive othering of the enemy. The next section specifically examines the enrollment of animal olfactory capacities into particular defensive and offensive wartime practices, noting how this depends upon cross-species and idiosyncratic sensory translations. The following section explores the mobilisation of members of specific indigenous communities as *spoorsnyers* (trackers) in particular milieus of combat, and the olfactory dimensions of such tracking activity. The final empirical section explores experiments in machine olfaction and sensory prosthetics developed in particular warsapes.

Drawing upon this specific genealogy, I then discuss the overall nature of olfactory regimes of war and the particular affordances of indexical olfactory traces of materiality for warfighting. I argue that martial attempts to harness the power of smell constitute a heterogeneous and grounded 'minor science' rather than the fully rationalised organisation of a perceptual field. Nonetheless, given the distinctive and supplementary logics of smell beyond the visual, I point to how exploiting olfactory traces has become a renewed focus of concern for militaries in recent years. The paper concludes by discussing some of the implications of this activity for

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<sup>1</sup> Notable exceptions include Das (2005), Daughtry (2014, 2015), Goodman (2010), Gregory (2014, 2015), Hast (2018), Naser-Lather (2018), Saunders and Cornish (eds) (2017), Sylvester (2013).

broader analyses of martial sensation and power, and suggests that further empirical engagement with the fabrication of multiple sensate regimes of war may resonate with the wider analytic commitments of ‘martial empiricism’ (Bousquet, Grove and Shah, *this volume*).

### Smell and War

The sense of smell is mediated by the olfactory system, a system capable of exquisite sensitivity and discriminatory power. The physiological process that informs the sense of smell is essentially one of chemoreception whereby odorants, airborne chemical molecules, are inhaled through the nose and stimulate various olfactory receptor cells that are located in the upper nasal cavity in humans. Impulses generated by these receptor neurons are transmitted via the olfactory nerve to the olfactory bulb. They then travel via direct neural pathways to other parts of the limbic system responsible for the production of memories and emotions, mostly bypassing those parts of the brain responsible for language and cognition (Buck 2004). The sense of smell thus provides direct and continuous information about the chemical composition of the surrounding atmosphere. It is also the only sense that cannot be switched off, we smell all the time and with every breath that we take, 23,000 times a day. (McKenzie 1993; Low 2005). This constant chemical sensitivity enables both the apprehension of emerging but not yet fully realised presences in an environment and/or notes their lingering afterwards as traces. Smell thus continuously mediates between the present and the absent, the proximate and the distant, the interior and the exterior. As Elaine Scarry notes, ‘smell is a sensory mode that has emerged to watch over the entry of the world into the body’ (1985: 48).

That said, one reason posited for the under-analysis of smell is its supposed lowly position in the hierarchy of the senses in modern Western culture and epistemology, a ‘modernity that has been normally considered resolutely ocularcentric’ (Jay 1988: 3). Indeed, compared to sight, which appears ‘so rational that it may be analyzed by the laws of geometry’ (Gonzalez-Crussi 1991: 71), smells often seem to escape straightforward spatial and temporal determination and analysis. Smells emanate from objects but are not part of them, they waft and drift and linger in space and time, avoiding fixation and localisation (Bubandt 1998). Olfactory experience can ‘seem to lack the spatial content necessary for object perception’ and is often characterised instead by spatial and temporal indeterminacy (Mizrahi 2014: 171). Smell is thus often considered the least intellectual or informative of the senses, seemingly attuned as it is to the insubstantial and the formless (Gonzalez-Crussi 1991: 65). The denigration of smell and the

hegemony of vision in Western societies since the eighteenth century has also been linked to modernity's obsession with clarity and order (Bubandt 1998; Bauman 1993). Classen, Howes and Synnott (1994: 5) argue that 'smell is probably the most under-valued sense in the modern West, possibly because it is felt to threaten the abstract and impersonal regime of modernity by virtue of its ... boundary-transgressing properties, and its emotional potency'. And further that 'due to its marginal and repressed status in Western culture, smell is hardly ever considered as a political vehicle' (1994: 161). One final reason for the under-analysis of olfaction is that smells are often uncanny, enigmatic, difficult to speak of and record. As the anthropologist Anna Tsing puts it, 'describing smell can seem as difficult as describing air' (2015: 46). Our vocabulary of smell is thus primarily metaphorical and self-referential – we typically speak of smells being *like* other smells.

However, olfaction is crucial in evolutionary terms to survival and the apprehension of danger, and particular smells can evoke such vivid, whole body sensations and emotionally charged memories that its political significance should not be dismissed so quickly. Moreover, *war* is a crucible of often radical phenomenological and sensory experience for many of its participants, transforming everyday sensory hermeneutics, the hierarchy of the senses, and remaking associated ways of knowing and rules for living in the world. Santanu Das' (2005) analysis of First World War literature thus notes how the sensory hermeneutics of soldiers were marked by the heightened significance of smell, taste, sound and touch as their bodies encountered endless 'slimescapes' of mud in the trenches. Derek Gregory's analysis of the 'corpographies' of war, embodied ways of knowing and mapping deployed by soldiers on the ground in wartime, also highlights how sensory hermeneutics beyond the visual became crucial to survival in other milieus of conflict including the deserts of North Africa and the rainforests of Vietnam (2014, 2015). He further notes that the senses may be so thrown out of kilter by the synaesthetic intensities of battlefield violence that accounts of such experiences speak at times of a complete unbuttoning of the Enlightenment disciplining of the senses, leading survivors to doubt their humanity (2015: 39-40). In the following sections, I will explore further how smell has figured in various wartime practices, focusing initially on the ways that soldiers have attuned to the olfactory.

## Smell Discipline and Awareness

Militaries have long been concerned with understanding and exploiting the affordances of olfaction in wartime. One prominent contemporary dimension of this is that military training often incorporates attempts to mimic the multi-sensory disorientations of wartime. For example, at the US Fort Irwin National Training Centre in the Mojave Desert, the immersive training scenarios undertaken in mock Middle Eastern villages incorporate constant exposure to a variety of simulated smells specifically synthesised by olfactory engineers. The odours deployed range from the orientalist aromas of ‘Middle Eastern Cooking’, ‘Hookah’, and ‘Camel Droppings’ right through to the viscera of ‘Vomit’, ‘Corpse’, and ‘Burning Flesh’ (Sensoryco. 2017). The logic at play in such training is essentially one of pre-exposure and sensory inoculation. By habituating soldiers to what are considered potentially disruptive smells the hope is that any disorientation might be attenuated if similar smells are encountered in real life scenarios (Gayde 2015, Holm 2015). The ultimate aim then is that soldiers’ responses to particular smells become deadened in the service of military efficiencies.

However, beyond such basic forms of multi-sensory acclimatisation, militaries have also attempted to instantiate heightened and more subtle olfactory attunements in soldiers. These include cultivating attentiveness to both the nature of their own smells and to the olfactory traces of others, particularly when undertaking patrol, reconnaissance and stealth combat missions. Here the underlying logic is less about familiarisation with certain disruptive smells in order to reduce possible disorientation, and more about the reshaping of everyday corporeal habits and the refinement of discriminatory olfactory capacities. John Hockey’s ethnography of UK infantry training highlights in particular how recruits are trained to sense the potential presence of the enemy right across the sensorium, including via specific attunement to aromatic indicators in particular environments and atmospheric conditions:

*‘Fags, cooked grub, smellies, piss, shit and the like are all dead give-aways particularly if the ground is closed (woods etc) or say it’s hot. You have to be like a bit of an animal out there, you have to be alert for his (enemy) traces’ (Corporal, South Armagh, cited in Hockey 2013: 96)*

At the same time, Hockey notes how infantry must learn to minimise their own olfactory traces, being attentive to the direction of the wind and engaging in smell camouflage to cover their

own tracks. Memoirs and oral histories of the Vietnam War similarly detail the lengths that US long-range patrols would go to in order to avoid olfactory detection. These included not laundering field clothes, not bathing prior to missions, not smoking on patrols, not using odorous heat tabs to cook with, mixing rations with cold water only, burying all waste and litter, forgoing the use of any soaps, deodorants or mosquito repellents (Ankony 2009, Chambers 1998, Flynn 2015, Lanning 1988, Linderer 1991). Field manuals offered the following summary advice regarding the use of any potentially odorous material when on patrol: *'If the local indigenous population doesn't use it, your recon team shouldn't either'* (Macv Recondo School, Patrol Techniques 704-2: 'Smell', cited in Chambers 1998: 180). Soldiers on deep reconnaissance would take antidiarrheals to reduce bowel movements as their fecal matter *'smelled differently from the enemies' and was a calling card announcing GIs had been in the area'* (Lanning 1988: 122). They would even fundamentally change their diets in order to try and alter the smell of fecal matter and their own sweat:

*'We used to eat their food. I'd find caches of rice. I used to live off small birds and snakes. If you're out there a period of time, you'd develop an odor which is undetectable ... you could smell Americans because of the garbage we ate - especially C-rations'* (Dave Nelson, cited in Hansen, Owen and Patrick 1992: 24)

*'Smoking was not even up for discussion. The gooks didn't wear insect repellent, and neither did we. The enemy could smell it on you and locate your position. Cooking was out of the question. Rations were eaten cold ... After six days in the jungle, the combination of stale sweat and plain old body odour made us all stink. But the smell could actually be an advantage. Your diet gave you a distinct aroma. The gooks smelled like rotten fish. We had been eating Vietnamese rations for the past two weeks, just to pick up their smell. If any trail watchers got downwind from our team, they'd think we were another VC unit'* (Larry Chambers, cited in Flynn 2015: 2).

Apart from the numerous practices of smell discipline that are detailed in Chambers' quote above, one further point worth noting is that there is also a notable olfactory othering going on. An initial practical appreciation of dietary-related differences in aroma quickly segues into a potent language of reified, racialised and animalised distinction – *the gooks smelled like rotten fish*. Indeed, analysis of olfaction more generally often highlights its intimate entanglement with issues of identity and boundary formation, whereby the recognition of odorous differences becomes further culturally interpreted in terms of fundamental moral distinctions, social

hierarchies and the felt dangers of pollution and miasma (Low 2005). Smell is more than just a way of sensing the world then, it is also a means of making sense of the world, the formation of an ‘osmology’ (Classen et al 1994: 116). It is often an idiom for the reproduction of ideas of ‘race’ and the naturalisation of other hierarchical social classifications<sup>2</sup>. Given the wider cultural and military imperatives to think of enemies as dehumanised others, it is unsurprising that well-worn frameworks of oriental and racial classification were often mapped onto olfactory experiences in wartime, reinforcing such ideas and hierarchies.<sup>3</sup>

### Animal Olfaction

Beyond the ‘somatic work’ (Vannini et al 2011: 19) of attuning the regular soldier’s own sense of smell and the entrainment of their embodied practices of smell discipline and camouflage,<sup>4</sup>

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<sup>2</sup> This pronounced entanglement of smell with identity formation is ironically heightened because smells fundamentally transcend bodily surfaces and transgress boundaries, becoming inhaled by and clinging to other bodies. The negative cultural associations of body odour in many societies (Classen et al 1994) and in particular expressions of distaste and *disgust* at the smells of others can be understood as attempts to shore up self-identity, to repulse the boundary-crossing and contaminating affective force of such emanations (Bubandt 1998).

<sup>3</sup> For example, in her analysis of US-Japanese engagements in the Pacific in the Second World War, Susannah Callow (2017) notes that the belief in a distinctive and essential Japanese odour was extremely pervasive amongst all sections of the US military, with a 1943 manual for US soldiers stating that ‘*at night a Jap can often be detected by a characteristic odor, which resembles the gamy smell of animals*’ (Arthur Goodfriend, cited in Callow 2017: 161). Further, any such distinction was not understood in terms of e.g. dietary or hygiene related cultural differences, but rather as an essence, an innate racial odour. Indeed, an exploratory US training programme for sniffer dogs at the time deployed so-called *Nisei* US soldiers, the second generation American children of Japanese immigrants, as ‘bait’, the underlying assumption being that they would also possess this essential and immutable Japanese racial smell for the dogs to learn.

<sup>4</sup> Wartime smell discipline and camouflage was engaged in by all sides. For example, in the tunnel complexes of areas such as Cu Chi in Vietnam, the National Liberation Front also practised smell mimicry, deliberately washing with scented soap stolen from US military bases to try and mask other emissions through the air vents of their otherwise hidden underground locations. Sniffer dogs searching

military olfactory regimes have also been constructed through the mobilisation of numerous other olfactory capacities and sensibilities, both human and non-human. Whilst humans can distinguish an enormous number of chemical compounds at very low concentrations, many non-human animals possess far superior olfactory abilities and are capable of detecting scents many miles away. Indeed, smell is the dominant sense through which certain non-human animals navigate, experience and ‘create’ their phenomenal world (von Uexküll 1926). These capacities are partly explained by the relatively larger area of the brain devoted to olfaction, and the much larger number of smell receptor neurons, in the nose or on antennae, in species such as dogs and bees.

The heightened olfactory abilities of non-human animals, particularly dogs, have thus been extensively mobilised in wartime to detect a range of odorants and in a variety of conflict-related practices. These include sweeping searches for weapons caches and explosives, the detection of mines and tunnels, the guarding of bases, accompanying soldiers on patrol duties, tracking the enemy across terrain (Cudworth and Hobden 2015, Hediger 2013, O’Donnell 2018). For example, it is estimated that over 4,000 military working dogs were deployed by US forces in the Vietnam War, predominantly German Shepherds performing sentry and patrol duties in Scout Dog Infantry Platoons, and a smaller number of Labrador retrievers deployed in Combat Tracking Teams (Alger and Alger 2013, Merritt 2018). In Vietnam a much greater familiarity with the dense bush and jungle terrain gave local Vietcong soldiers significant strategic advantages in preparing ambushes and engaging in highly effective hit-and-run tactics before disappearing back into the environment. These place-based aptitudes and instincts were themselves often cast in animalised terms by US troops, as in the following account where a young US soldier is berated for wearing aftershave before his first combat mission: ‘*You can’t go out on patrol smelling like a whore. Charlie will smell you a mile away. Charlie has instincts like a fucking animal. He lives out here for crying out loud*’ (Burnam 2000, cited in Hediger 2013a: 59).

Scout dogs patrols teams were thus often assigned to companies or platoons who were encountering significant trouble from ambushes and insurgent attacks, and were widely

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for the entrances to the tunnels would not recognise such smells as suspicious (Mangold and Penycate 2005).

credited with the saving of many lives (Alger and Alger 2013). Dogs could detect olfactory realities at levels that were completely imperceptible to humans, sensing the potential presence of danger much further ahead. However the legibility and utility of such perceptions was fundamentally predicated upon the development of intimate one-to-one relationships between war dogs and their handlers (Murray 1998). In order to benefit from the dog's acute olfactory instincts, the handler had to learn to read and trust their companion animal's individual personality, demeanour and reactions on patrol. They needed to allow the dog certain freedoms of movement while watching closely for the expression of various types and degrees of 'silent alert' that were unique to the dog and indicated the possible detection of unfamiliar airborne scents.

*Many dogs did not have an easily recognizable pattern of behavior that signified detection of danger. It was up to the handler to interpret his dog's behavior .. this ability was one that was first developed in school and was further refined by training and experience. Because the signal of alert varied, the importance of knowing how to interpret a dog's actions cannot be overstated. It required vigilance on the part of the handler in noting every nuance of his dog's behavior. If the dog alerted and the handler did not see or recognize the signal, it could be fatal for the dog team and the other members of the unit who were following. (Murray 1998: 45)*

Sensate regimes here then were thoroughly idiosyncratic and co-constituted, learnt processes of interaction, awareness and sensory translation across species. John Burnam, a US scout dog handler in Vietnam, described his relationship with his military working dog Timber as follows: *'I learned that my scout dog is the real pointman, not me. It would be my job to translate his dog language into English, so I could convey to everyone else what the dog sensed ... he was the one in charge'* (Burnam 2000: 115). As Hediger (2013a: 60) notes, Burnam's memoirs of his experiences on the ground are punctuated by many of these slippages and reversals of human/animal boundaries and hierarchies. The human lives of those on patrol were fundamentally dependent upon the scout dog's more-than-human capacities to sense danger, challenging conventional narratives of human autonomy and exceptionalism. Moreover, intense emotional bonds of love and care often developed between dogs and their handlers in conflict scenarios, although this wartime 'web of interspecies dependencies' (Haraway 2008: 11) was underwritten by wider structural and instrumental relations of domination (Cudworth and Hobden 2015, Hediger 2013a). Indeed, US war dogs were ultimately classified by the

Department of Defence as ‘equipment’ and, in spite of the impassioned pleas of their handlers, all but a handful were abandoned to unknown fates in Vietnam at the end of the war (Burnam 2000, Alger and Alger 2013).

In addition to the regular defensive use of scout dogs to warn US troops on patrol of potential guerrilla attacks, a number of elite Combat Tracker Teams (CTTs) were also established by the US in Vietnam, drawing on a model previously used by British colonial forces in Kenya and Malaya<sup>5</sup>. These highly-trained units typically consisted of five men - a team leader, a visual tracker, a cover man, a radioman, and a dog handler with a Labrador retriever - and were typically despatched to areas where firefights had recently taken place to try and pick up and follow the tracks of the enemy as they retreated back into the jungle. They thus engaged in more offensive missions, attempting to rapidly pursue and eliminate fleeing enemies, or locate their positions and call in additional forces. Labradors in CTTs were specifically trained in following ground scent trails from ‘scent articles’ such as footprints or bloodstains that had been spotted by the team’s visual tracker<sup>6</sup> (Merritt 2018).

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<sup>5</sup> Although the UK was not officially involved in Vietnam War, the British military covertly trained the first wave of U.S. tracker teams at the British Jungle Warfare School in Malaya, with the U.S. Army later establishing its own training school at Fort Gordon, Georgia (Merritt 2018).

<sup>6</sup> This practice of wartime tracking, particularly with dogs, also further contributed to a discourse that produced the enemy as a form of animal prey to be hunted and killed. Writing of the decision to deploy dogs to hunt down the fugitive participants of a slave revolt in Jamaica in 1796, Chamayou relatedly notes that:

*“The recourse to dogs was explained by the tactical requirements of a guerrilla war conducted against an elusive enemy, finding whose trace was the chief problem. But this was not all; it was also a matter of mental categories. Resorting to bloodhounds was a powerful psychological way of renewing and reimposing the absolute ontological gap between the masters and their slaves, which the insurrection had imperiled” (2012: 64).*

## Tracking the Enemy

This type of multi-sensory *tracking* and pursuit activity also came to play an increasingly important role in other counter-insurgency campaigns in the wars of decolonisation in the second half of the twentieth century, where the fundamental grammar of the fighting was similarly insurgent hit-and-runs and skirmishes prosecuted by elusive enemies operating across, and retreating into, wide bush and jungle terrains (McCuen 1966, Stapleton 2014, 2015). The development of advanced tracking capabilities and pursuit tactics thus became crucial elements in the ‘counter-insurgency toolbox’, with conflicts such as the wars in Angola, Rhodesia and South West Africa from the 1960s to the 1980s becoming ‘dominated by tracking and anti-tracking’ (Stapleton 2015: 322). Tracking involved more than fixed situational awareness. It was the active pursuit of a mutable trail, the thorough imbrication of multi-sensory knowing with *movement*:

*“tracking is the ability to pursue and close with an animal or human by following signs, commonly called spoor ... left behind in the environment. These include footprints, disturbed vegetation, evidence of feeding, biological waste, sounds and smell. Experienced trackers use the appearance of these signs to determine the direction of their subject’s movement and the approximate age of the spoor to indicate how far ahead in time and space the subject is”* (Stapleton 2014: 229)

Accomplished tracking required a thorough familiarity with the specific landscape, climate and ecology of the local region in order to be able to successfully follow spoor and anticipate enemy movements. While some skills could be taught, the instantiation of tracking and hot pursuit into the heart of counter-insurgency warfare was crucially dependent upon those who were already well-practised masters of these skills being recruited and deployed as wartime trackers. State forces thus specifically recruited members of indigenous communities and particular ethnic minorities that were renowned for their bush knowledge and highly nuanced skills in tracking and hunting. For example, the South African Defence Force enlisted large numbers of semi-nomadic San (‘Bushmen’) people as *spoorsnyers* (trackers) in the war in South West Africa (Namibia). San trackers were formed into rapid reaction tracking units and specialised Bushmen Battalions, and enrolled into other regular military units and Special Forces teams, establishing a powerful martial reputation (Gordon and Douglas 2000: 186).<sup>7</sup>

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<sup>7</sup> While the recruitment of the San acknowledged the superiority of their tracking skills over other

Smells and atmospheric fluctuations were significant dimensions of such tracking activity. In an analysis of San wartime tracking, Gibson (2019: 390) notes that, “when trackers are on a spoor or on patrol they continuously move into and are surrounded by an olfactory landscape: it includes their own and others’ odour, as well as traces from the body of an insurgent, the aroma of certain plant sap that is exuded when broken, the movements of birds, animals and insects attracted or alarmed by the smell of a person in the landscape”. Further, this was often experienced at a very intuitive level, as expressed in the following account of wartime tracking by a San spoorstryer:

*“we know our own smell but sometimes these people (insurgents) have been walking for days, carrying heavy loads in the heat ... they have a specific smell of sweat that is different from ours or from the white soldiers ... they do not often make fire, but sometimes they kill something, if it is fresh you can get that coppery smell or smell broken intestines ... as the air, the wind moves you can pick up traces ... it is quite strong before the rain...be very, very careful then...something is not right, you just feel it.”* (Bo: interview, cited in Gibson 2019: 389)

Ethnographic accounts of the tracking of animals by Khoi and San hunters in Southern Africa further describe how the ‘wind connects the hunter with the prey like a thread leading from one body to another’ (Low 2008: 68). For Ingold (2011: 121), ‘the whole environment is riddled with such scent threads, binding its human and non-human inhabitants into an intricate mesh and percolating the very depths of their awareness’.

Tracking thus involved diverse sensory modalities and ontologies, the tracing of elusive threads of scent as well as direct lines of sight. When sensed through such a regime, the body of the prey was never simply contiguous with the porous boundaries of its skin. Rather, it always exceeded and existed beyond its visible surfaces, including via its odorous emanations and other smells generated as a result of its actions, producing a trail of spoor that a skilled tracker could actively pursue. The advanced skills and sensibilities of indigenous *spoorstryers* were thus crucial components for such wartime tracking, with attunement to the olfactory an often critical source of knowledge when hunting down the enemy.

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soldiers, their enlistment nonetheless occurred in a context of highly unequal racial politics. White leadership defined South African military force and was implemented right down to the level of small tracking teams (Uys 2014).

## Machine Olfaction

The rainforests of the Vietnam War were also the breeding ground for further techniques in olfactory tracking. Here the desire for enhanced situational awareness meant US forces increasingly turned to experimental techno-scientific means to try and augment human olfaction and exploit the particular affordances of smell for tracing the enemy. As such, in 1966 American patrols from the 1st Air Cavalry Division were sent out with the point-man carrying a large backpack linked via a hose to an air intake funnel that was attached below their rifle barrel. This device, the Olfatronics XM-2, was developed by General Electric for the US Army Chemical Corps and was colloquially known as the People Sniffer (Kirby 2007, Flynn 2015). It was essentially a man-portable laboratory designed to funnel downwind air through the intake into a real-time cloud chamber chemical assay kit contained in the backpack. The idea was to sense on-the-fly changes in atmospheric ammonia levels, indicative of effluents such as human sweat or urine, and thus supposedly of the potential presence of the enemy up ahead. The wearer would be alerted to any rising ammonia levels via a needle on a meter also mounted below the rifle barrel as well as via a noise in an earpiece they wore. The experiment was short-lived on the ground however, principally as fluctuations in the air currents at ground level meant that the device often registered the sweat of the wearer rather than any concealed North Vietnamese troops. The backpack was also heavy and made a faint audible *tick* which made it particularly unpopular and unnerving for those designated on point (Kirby 2007).

As such, a further version of the People Sniffer was developed into a helicopter-mounted configuration, the XM-3 Airborne Personnel Detector, attuned both to the concentration of ammonia and to carbon molecules produced by cooking fires that could be detected in rising air currents. The XM-3 was initially deployed in 'Operation Snoopy' where helicopters flew slowly at treetop level over a broad area in sweeping search mode, with the co-ordinates of any chemical indications of signs of life below recorded and passed on for subsequent kinetic targeting by air strikes. From 1970 the detector became a standard-issue item used daily in patrols by light Huey, Loach and Bell helicopters (Kirby 2007). Tactics also evolved from initial intelligence gathering patrols towards integrated hunter-killer missions, where one or two low-flying sniffer helicopters flew in formation accompanied by Cobra AH-1 gunships equipped with heavier weapons and CS Gas cluster bombs in order to try and immediately flush out anyone below whenever readings indicating human activity were noted (Parker 1990). The ultimate goal of these so-called SCORPION (Special Combined Operations for Personnel

Identification and Overt Neutralisation) missions was thus to both '*sniff them out and snuff them out*' (Jack Inman, cited in Galkiewicz n.d.).

However, amongst other idiosyncrasies, one notable problem was that the detectors had difficulty distinguishing between occupied and recently abandoned areas since the target particulates could hang in the air for many hours, a fact that was quickly exploited by North Vietnamese forces who responded to Snoop missions by lighting smouldering fires around patrolled environments to generate false positives (Kirby 2007, Cockburn 2015). One operator thus reported at the time that '*It's sorta like a scout dog. You've got to know your machine, know it can make mistakes. All our machines have personalities.*' (Sgt. Penn Wilson, cited in Arnett 1967). The overall effectiveness of the XM-3 was thus ambiguous (Kirby 2007, Rawnsley 2014), although both the XM-2 and XM-3 generated plenty of positive media coverage back home that American technoscience was winning the war in Vietnam (e.g. Time 1967; Popular Mechanics 1968).

A further significant moment in the genealogy of technoscientific military olfaction occurred in the attempt to stop the flow of enemy combatants and resources from the North Vietnamese Army to support the Vietcong in the South along the key jungle supply route, the so-called Ho Chi Minh trail, in southeastern Laos. The particular paths used changed constantly, the area was too broad and inhospitable for ground troops to monitor and it had proved impossible to see movements from the air, both because of the jungle canopy and because much movement occurred at night. In the field laboratory of the Vietnam War, the proposed solution, *Operation Igloo White*, was to seed the entire area through which enemy troops might be moving with twenty thousand sensors thrown from the air (Dickson 1976). The sensors, cutting-edge electronics disguised as vegetation, were all attuned to the *non-visual*, with chemoreceptors detecting olfactory changes in atmospheric ammonia and carbon levels as before, as well as sensors attuned to seismic vibrations in the earth and acoustic changes in ambient noise, all of which might be associated with the movements of troops or enemy trucks.

Transmission planes constantly flew over the area to relay triggered signals on to a vast intelligence control room, the Infiltration Surveillance Centre, in neighbouring Thailand equipped with the most sophisticated IBM 360-65 mainframe computers available. The temporal and spatial patterns of activated sensory signals were analyzed to try and ascertain if any were indicative of potential enemy movements and, if so, future locations were

extrapolated and the nearest aircraft bombers to the area were instructed to strike. Strikes were undertaken blind with no visual data involved, no attempt to confirm what was triggering the sensors - the movements of troops, civilians, or indeed water buffalo. The timing of the complete 'kill-chain', from signal transmission through processing and target identification to bombing, could be as little as five minutes (Dickson 1976: 86).

Igloo White was phenomenally expensive, costing \$1 billion dollars a year during its period of operation (Nalty 2005). Whilst vested interests in the Department of Defence and other ideologues of 'technowar' (Gibson 2000) robustly defended the operation with self-referential statistics that created an illusion of mission success (Elish 2017), daytime reconnaissance often failed to find any enemy bodies or destroyed vehicles where attacks had been targeted. Further, North Vietnamese soldiers, well-versed in the use of countermeasures and decoys, again quickly learnt to spot and spoof the sensors, producing false positives by tactics such as playing recordings of truck movements and hanging buckets of urine in the trees, generating simulacra of enmity in the sensory system (Davidson 1991, Cockburn 2015). By most accounts, *Igloo White* had manifestly failed in its mission to significantly disrupt the traffic on the Ho-Chi Minh trail by the time it was shut down in 1972 (Gibson 2000, Nalty 2005, Cockburn 2015).

Nonetheless, this experiment in sensory and data-driven war, attuned particularly to non-visual bodily traces including the chemical and the acoustic, represents an important early attempt to sew a distributed sensory grid across a specific enclosed topography, and to establish an information architecture capable of registering, archiving and exploiting the traces of bodily activity within that area. In *Igloo White* we thus see the flickerings of a more distributed, abstracted and increasingly autonomous system of machinic sensation, operating via the digital subsumption of myriad different signals. The particular sensory necropower deployed here was also underpinned by the abilities of distinctively-attuned sensors to register bodily presence even when visual radiations could not be sensed. Indeed, it was informed by the specific affordances of olfaction to register the chemical trace of an absent presence across a more diffuse space-time in ways that exceeded the spatial geometries and temporalities of vision. Visual apprehension of a body's spatiotemporal absence or presence occurs in more binary terms than the diffuse olfactory sensing of non-binary traces of absent presence, an apprehension of varying levels of chemical intensity that indexes neither complete absence nor presence but rather that which is approaching or lingering.

## Olfactory Regimes of War

Moving beyond Butler's (2012) sensitising concept of 'sensate regimes of war', the following section develops specific arguments from the particular genealogy of wartime olfactory practices traced in the previous empirical discussions. The first point I wish to reiterate is simply that wars are fundamentally embodied (McSorley 2013, 2014, Scarry 1985, Sylvester 2013), and occur in environments of brute materiality and recalcitrance to the best laid plans. As MacLeish (2013: 11) notes, despite major developments in advanced technologies of targeting and remote warfare in recent decades, 'the body's unruly matter is war's most necessary and necessarily expendable raw material ... the wars in Iraq and Afghanistan could not carry on without the physical presence of tens of thousands of such bodies'. Wars are thus inevitably experienced through all the sensory modalities with which myriad bodies constantly encounter mutable worlds. And as Daughtry (2014: 25) notes, 'for those caught up in the violent ambit of a combat zone, armed conflict feels much less like a geopolitical stratagem or the continuation of policy by other means and more like a full-spectrum sensory assault', one that often besieges, saturates and mangles the sensorium.

As previously discussed, Gregory (2014, 2015) has explored how soldiering on the ground involves multiple situated and embodied ways of knowing and navigating the battlespace, noting that sensory hermeneutics beyond the visual, e.g skilled acoustemology of the direction of shellfire, have often been crucial to survival. He understands the development of such embodied skills or *corpographies* as "not only a means through which militarized subjects accommodated themselves to the warscape - providing a repertoire of survival of sorts - but also a way of resisting at least some its impositions" (2014: 35). He further contrasts this intensely 'practico-sensory realm' (Lefebvre 1991) of improvisational and countervailing human accommodations to the depredations of the warscape with the more abstract rendering of space, and the relentless privileging of an optical-cartographic imaginary, in the planning of military violence. Although survival and destruction are clearly intimately connected existential planes of war, the analyses developed in this paper additionally highlight how olfaction in wartime has been developed not only for reasons of defence and survival, but has further been oriented towards particular offensive martial ends.

Alongside the soldier's own somatic work of smell discipline, camouflage, decoy and diet then, the olfactory regimes of war that I have detailed here have been crafted with the specific aim

of following and tracking diverse chemical traces of enmity. This has variously involved the mobilisation, and indeed breeding, of dogs' more-than-human sensory capacities, the entrainment of cross-species intimacies and idiosyncratic sensory translations, the conscription of the embodied skills and habitus of indigenous *spoorsnyers*, and the development of improvised experiments in sensory prosthetics. These disparate sociotechnical assemblages were crafted in order to enhance situated martial chemosensitivity, to follow particular plumes of volatile molecules at minute concentrations on the ground and in the atmosphere. Such olfactory regimes were thus place-sensitive fabrications of mobile chemoreceptive traps, enrolling the moist surfaces of canine noses, nomadic attunements to the inflections of the wind, and portable techniques of chemical assay in order to trace the movements of specific trails of indexical odorants. This activity was typically makeshift, grounded and discontinuous, tethered to local pragmatics and heuristics in the generative laboratories of specific warscapes. As such, it resembles the ambulant work of 'minor science', concerned more with 'following the flow of matter' (Deleuze and Guattari 1987: 373) rather than being informed by universal laws and abstractions. Its affordances thus differed from more abstract and ocularcentric ways of rendering and navigating space, being tied rather to 'the logic of the index [which] is indication and connectivity' (Doane 2007: 2), and the ontology of the trace.

The trace has a complex and unstable relationship to presence, being the mark of the absence of a presence (Derrida 1976). As discussed earlier, the chemical trace in particular indicates an emerging or lingering absent presence in ways that are fundamentally orthogonal to vision. It is for that reason that attunement to chemical or other indexical traces of materiality, via senses such as olfaction, has long been central to practices of sweeping search, hunting and militarised manhunting (Chamayou 2012). In the absence of clear threat or the visible enemy, and with no idea where to look or focus visual attention, martial power has explored other forms of sensing extensively and peripherally across space and time for the signature of threat, the trace and direction of enmity. As Mark Neocleous has argued, the permanently sniffing police dog in particular has extended the spatial and temporal vectors of state power such that '*a permanent and sweeping olfactory search of a wide and indefinable area can take place*' (2013: 203). Neocleous ultimately reads the development of war power and police power together, arguing that they express a combined concern with:

*'... the ubiquitous enemy of good order as existing anywhere and everywhere in a way that requires police infiltration of all space. The power of smell plays a crucial role in this*

*infiltration. And in this war, the sniffer dog is on the frontline. Yet one of the crucial features of this war is precisely that there is no frontline in the traditional military sense of the term'*

One reason why even now it is animal olfaction that is still on the frontline of martial attempts to harness the power of smell - whether to follow the invisible trail of the body, sense coalescing hints of enmity on patrol, or track the materiality of the arms cache, explosive or hidden IED<sup>8</sup> - is that, despite the experiments in machine olfaction detailed previously, there have yet to be fully scientific understandings of the precise way that olfaction works or the speed and directions with which volatile plumes of odorants disperse and linger through the medium of the air. As Bousquet (2019: 9) notes, the development of vision as the preeminent martial sense depended upon the 'rational organization of the perceptual field in a way that could reduce sensorial activities to certain logical rules and procedures amenable to mechanization and automation'. The harnessing of sound for martial ends followed a similar pattern once fundamental principles were established:

*"Just as with sight, the technical amplification of hearing ... and its integration into wider assemblages of location and targeting hinged on the constitution of a science of acoustic phenomena ... [which] established a theoretical understanding of the properties of sound waves and obtained empirical measurements of the speed at which sound travels through various media" (Bousquet 2019: 68)*

However, there is as of yet no comparable science of olfactory phenomena, nor indeed even theoretical consensus as to whether it is the shape (Buck 2004) or vibrations (Turin 2007) of particular chemical molecules that receptor neurons respond to. Reinartz (2014: 7) notes that even 'the biological and chemical nature of this denigrated sense remains to be worked out entirely.' Moreover, the movements of various plumes of molecules through unruly atmospheres, winds and temperatures are not well understood, notwithstanding some developments in the field of military climatology or 'black meteorology' - the study of toxic clouds of gas, their movements and dissolution - that accompanied the emergence of chemical 'atmosterrorism' in the twentieth century (Sloterdijk 2009, Pincus 2017).

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<sup>8</sup> Up to 2,800 dogs were used by US forces at the height of the conflicts in Iraq and Afghanistan to try and counter the growing threat of heterogeneous Improvised Explosive Devices (Salter 2014).

With fundamental properties and principles upon which mechanization and automation might proceed unclear, and those ‘electronic noses’ that have been built such as the XM-2 proving unreliable in real-world conditions and only capable of detecting a limited number of chemicals rather than compound odours (Penn State 2009), trained animals still vastly outperform the capacities of machines to trace a range of olfactory phenomena at minute concentrations over large distances. Indeed, Lieutenant General Michael Oates, the commander of the US Joint Improvised Explosive Device Defeat Organization (JIIEDDO), a major £23 billion program tasked with detecting and countering the dynamic proliferation of an entire ecology of low-tech IEDs which became the main source of threat to US forces in the wars in Iraq and Afghanistan (Grove 2016), admitted in 2010 that ‘Dogs are the best detectors’ (cited in Ackerman 2010).

This is not to say that the goal of more scientific comprehension and rationalised machinic simulation of olfaction is not being actively sought and extensively funded. As the frontlines of war are further undone in the global ‘war on terror’ and the martial desire for total spatial infiltration has only intensified, understanding and exploiting olfactory traces has become a renewed focus of concern for military futurism in recent years. One important research trend in the field of chemical sensing is the attempt to mimic the capacity of animal olfaction to recognise the “odour-prints” of myriad chemical compounds by bioengineering arrays of non-specific chemoreceptors whose responses are interpreted by combinatoric pattern-recognition techniques (del Valle 2017).<sup>9</sup> Over the last decade, DARPA has thus commissioned various

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<sup>9</sup> The holy grail of martial olfaction is this idea of identifying and archiving individual odour-prints, a desire that underpinned the Stasi programme of collecting ‘smell samples’ from political dissidents. Here pieces of stolen underwear, or the cloths used to wipe the sweat off the vinyl seats used in interrogations, were sealed in glass jars and stored for potential later use by sniffer dogs (Funder 2003). A related dystopian vision animates the following internal CIA assessment:

*“Once we have identified the medium of human scent analogous to the light and air vibration which stimulate sight and sound, it seems reasonable to suppose that we shall also find mechanical means to improve upon animal olfactory capabilities and not only to detect but to record the otherwise unknown presence of an individual. Our mechanical dog, when he is born, should be much more unobtrusive than his natural ancestor, should be able to tell us just whom he has smelled, and should maintain a reliable permanent record of his visitors.”* (Tebrich 1961: 36)

related and bio-inspired projects to try to understand, imitate and exploit the capacities of non-human animals and insects to engage in highly skilled and discriminating scent-related search behaviour. These include the Real Nose Project (Penn State 2009) simulating canine olfaction, and the Stealthy Insect Sensor Project. This latter project involves the training, selection and breeding of honeybee colonies to try and better understand, modify and exploit the scenting capacities of the swarm, itself a form of pheromone-based collective behaviour. Kosek (2010: 651) thus suggests that the bee is being '*remade as a military technology and a strategic resource for the battlefield ... humans are making bees into sensory prostheses that embody military interests*'.

A recent review of the present and future use of olfaction by the military once again reiterated that 'olfaction ... could be used to gain a significant tactical advantage over the enemy in a battlefield, as it is still a relatively underrated and underdeveloped but potentially powerful qualitative sensory ability' (Nagappan et al 2017: 9-10). Quite apart from any other reasons then, critical scholarship would benefit from trying to think in a more sustained manner about smell and its particular affordances and entanglements with war<sup>10</sup>, simply because of this renewed contemporary military engagement with the topic. Martial power is once again exploring the distinctive potential of olfactory logics and assemblages across various proliferating and cross-pollinating platforms from honeybee swarms to miniaturised drones (Kosek 2010). These are the potential hunters, beaters and pack animals of the future militarised hunt.

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<sup>10</sup> While martial attempts to locate and follow traces of threat and enmity constitute one highly significant dimension of wartime olfaction, there are many other important entanglements of smell and war that deserve further analytic attention and that I do not have room to address in this particular paper. For example, I noted earlier how the interpretation of particular odours may be intimately involved in the visceral othering of the enemy. However, the ways in which some smells in wartime, such as bodily decay, serve as a register of shared exposure and vulnerability may also potentially trouble the binary oppositions and moral relationships that war sets up. Olfaction may thus at times be an unstable and capricious idiom of ontological violence in wartime. In addition, the significance and meanings of olfactory sensation in war were crucially heightened and transformed by the threat of gas warfare, chemical 'atmosterrorism' and the weaponisation of breathable space in modern conflict (Sloterdijk 2009). With the air now becoming a medium of violence, the sense of smell and the fabrication of olfactory regimes attuned to its potential toxicity and lethality assumed a renewed and vital significance.

## Concluding Thoughts

War is a crucible of sensory experience, its becoming fundamentally entangled with a panoply of sensory practices and transformations, from the hallucinatory suspicions of night vision to the ominous mosquito buzz of drones, from the stench of rotting bodies to the feel of cold sweat on a veteran's skin. Moving beyond Butler's (2012) sensitising concept of 'sensate regimes of war', this paper has attempted to elaborate an analysis of *the transformation and fabrication of ways of sensing in the preparation, prosecution and aftermaths of war*. In particular, I have concentrated here on the typically under-analysed sense of smell. Smell is a sensory mode which can apprehend an emerging but not yet fully realised presence in an environment and/or note its lingering afterwards as a trace. Its complex mediation between absence and presence, proximity and distance, interiority and exteriority, means that the organisation and interpretation of olfactory sensation occupies a distinctive place in the becoming of war that deserves further analytic attention.

In this paper, I have highlighted in particular how the material indexicality of smell and its broad spatial and temporal infiltration enables the apprehension of potential threat in ways that are fundamentally orthogonal to visual recognition. I also pointed to how heterogeneous olfactory regimes of war have been crafted in particular milieus of combat with the specific aim of following and tracking such material traces of enmity, from the insurgent body to the Improvised Explosive Device. The fabrication of these regimes has been fundamentally entangled with situated martial practices and programmes of sweeping search, combat tracking, hunter-killing, militarised manhunting, and the countering of invisible IEDs. These developments not only supplement those ocularcentric accounts of martial sensation and power that concentrate principally on how increasingly rationalised and abstract frames and ways of seeing, and associated ontologies of visual presence, become coterminous with targeted projections of violence in the doing of war. In addition they crucially challenge such narratives by pointing to the importance of an alternative ontology of the chemical signature or material trace of enmity, and the significance of mobile tracking over targeting, for the constitution of specific warsapes. Here the gaze has often been downcast, the capacity of vision to apprehend and navigate the world has been limited, and rather to smell has been to kill.

One point worth mentioning here is that in concentrating in this paper predominantly on smell to the relative exclusion of the other senses I may be practicing a form of sensory bias, and it

could be argued that the role of olfaction in wartime could be better explored within a more plural sensory analysis. Certainly experience is always multi-sensory and synaesthetic, with different senses immanently checking and informing one another in dynamic and shifting efforts to make sense of things (Merleau Ponty 1962). Life is not experienced as being 'sliced up along the lines of the sensory pathways by which we enter into it' (Ingold, 2011: 136) and there are never any 'pure' sensory mediums (Mitchell 2005). Nonetheless, as Classen et al. (1994: 10) argue, most scholarship has long completely excluded olfaction from its accounts without any accusation of sensory bias and, as such, an initial singling out may be strategically necessary for 'unless smell is placed right under our noses, so to speak, it can get lost in the shuffle'.

More generally, I suggest here that further critical work on war would benefit from additional nuanced empirical inquiry into the emergence and fabrication of sensate regimes of war beyond the current predominant focus on the ocular that has become particularly established through the visual turn in scholarship with its specific theoretical and conceptual underpinnings. Even when such work is fundamentally concerned to highlight the constructed nature of martial visualities, and particular studies specifically contest the truth claims and exclusions of certain scopic regimes (e.g. Grayson and Mawdsley 2019), there is nonetheless an analytic danger that the overall orientation of such a body of work may be partially complicit with an underlying ocularcentrism in its focus, methods, and epistemology. Some caution is advisable in order that the ocular, an undoubtedly crucial locus of martial power, does not become a fetishised site of analysis, potentially obscuring the broader comprehension of a more complex and variegated martial partition of the sensible, and of the myriad ways that war is conducted through and on all the senses. One task for future work may thus be putting this existing scholarship on martial vision into more sustained dialogue with analyses of war that are more theoretically sensitised and empirically attuned to inquiry right across the sensorium, in order to enable a broader accounting of how plural and diverse sensate regimes of war are organised, overlap and intersect, in particular milieus of combat and beyond.

War is a constantly shape-shifting, but enduringly injurious, transhistorical and transcultural social institution (McSorley 2014, Sylvester 2103). As such, Bousquet, Grove and Shah (*this volume*) argue that analytic engagement with its fundamentally generative capacities, its experiential crucibles, and its continuous and promiscuous lines of becoming demands forms of inquiry that reject the desire for any overarching theoretical capture of war. They advocate

rather for ‘exploring war from the inside-out’ and for a ‘martial empiricism ... [capable of] following the trail of war wherever it leads us rather than camping in the places where we already expect to find it’ (Bousquet et al. 2020: 2). I suggest that such an endeavour is fundamentally resonant with the analytic orientation, empirical commitments and conceptual lens of sensate regimes of war as developed in this paper. I further argue that future inquiry into the heterogeneous becomings of war may benefit from a more sustained and full-spectrum empirical engagement with the transformation and fabrication of multiple sensory modalities, regimes and experiences right across a sensorium that is itself continuously being made and unmade through war. Along these lines I hope to have demonstrated here how an analytic engagement with the sense of smell in particular can speak to crucial issues including the apprehension of threat and following the trails of enmity. I thus suggest that wartime smell is very far from an esoteric concern but rather ultimately an issue of life and death.

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