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Prifysgol Abertawe

One hundred and ten years of tears: examining the human experience of tear gas use and its memories, memorials, and meanings

Helen Katie Turner - [redacted]

Swansea University

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ABSTRACT

This thesis explores the everyday experience of being exposed to tear gas and how it is remembered, represented, and retold. The research into the human experience of tear gas use, its implications and legacy, interrogates how tear gas is explicated in a broad spectrum of material and media sources as well as through commemorative practices at sites of memory. Utilising primarily secondary sources, this thesis offers an interpretation of how these representations convey and shape an understanding about what tear gas use means to the people it is used upon.

Whilst tear gas does not chemically persist in the air, the sources and spaces of tear gas use show that it indelibly endures in memory. This thesis acknowledges both the context and the significance of existing, predominantly scientific, literature on tear gas whilst moving to set itself apart and engages valuable perspectives from feminist and emotional geographies in conjunction with creative methodologies.

From murals on the walls of Free Derry, proclaiming that while tear gas encapsulated them, it did not obscure or conceal their struggle, to poems that place tear gas firmly as part of the lived experience of being Black in America, looking at the multitude of ways tear gas use is remembered helps us to vicariously experience that exposure for ourselves.

This thesis finds the disastrous and detrimental experience of tear gas use can be affirmed through the construction of physical memorials and monuments, as well as in the active and passive voices of dissent which are teased out from a critical analysis of narrative or visual sources. Narratives of power, vulnerability and resilience are brought forth from the theoretical foundation of this thesis – geographies of memory, embodiment and grief – into a new way to conceptualise the actors, objects and experiences of tear gas use.

DECLARATIONS

This work has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree.

Signed..... [redacted] .....

Date.....30/09/2023.....

This thesis is the result of my own investigations, except where otherwise stated. Other sources are acknowledged by footnotes giving explicit references. A bibliography is appended.

Signed..... [redacted] .....

Date.....30/09/2023.....

I hereby give consent for my thesis, if accepted, to be available for electronic sharing.

Signed..... [redacted] .....

Date.....30/09/2023.....

The University's ethical procedures have been followed and, where appropriate, that ethical approval has been granted.

Signed..... [redacted] .....

Date.....30/09/2023.....

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I joined British Transport Police in 2015, immediately setting out my intention to apply for a PhD programme. When I returned to Swansea University to commence my studies in September 2016, I had been working here for just under a year. Fast-forward to writing this, and my career at BTP has been as constant as this work; the two interwoven. On quiet days I would be able to read a paper or two over my lunch break; on busier days (and there seemed to be so many of these) I would think wistfully about what I needed to write when I next got the chance to turn off ‘response mode.’ This didn’t happen very often. Working full-time alongside writing part-time is as close to pure insanity as I have ever come, and should be totally inadvisable. The trouble is, I was in the middle of the thesis before I really registered that it had begun, and so pure stubbornness had to carry me through the rest of the project, competing at every stage with the job that I love. It is therefore with wholehearted gratitude that I acknowledge Jo Cash, Ray Shields, Ricky Twyford, Sandra England, Will Jordan and Sean O’Callaghan (thinking also of Jonathon Cooze, Chris Horton and David Oram) for your advocacy for me and your patience with me, and for allowing me to be something other than the Force Preparedness Manager occasionally. My team too: Keith

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GLOSSARY - DEFINITIONS AND ABBREVIATIONS

Abbreviation / acronym	Meaning
AAG	American Association of Geographers'
ACF	Army Cadet Force
ACPO	Association of Chief Police Officers
AEF	American Expeditionary Force
BBC	Bromobenzyl cyanide – a tear gas
Blepharospasm	Involuntary spasm of the eyelid
BLM	Black Lives Matter (movement / social justice cause)
BTP	British Transport Police
CAP	Chloroacetophenone – a tear gas
CAPTOR	Brand name of PAVA utilised in policing
CBRN	Chemical, Biological, Radiological and Nuclear
CCA (2004)	Civil Contingencies Act 2004
Chemosis	Swelling and irritation of the conjunctivae
CN	phenyl chloride or chloroacetophenone (see CAP)
CoP	College of Policing
CR	dibenzoxazepine
CS	2-chlorobenzomalononitrile
CW	Chemical warfare
CWC	Chemical Weapons Convention
CWGC	Commonwealth War Graves Commission
CWS	Chemical Warfare Service
DA	Diphenylchlorarsine – a vomiting agent
Dermitis	Inflammation or blistering of the skin
DC	Diphenylcyanoarsine – a vomiting agent
DM	Diphenylaminechlorarsine – a vomiting agent
DoD	Department of Defense (US)
HAZMAT	Hazardous Material
IWM	Imperial War Museum
KSK	Ethyl lodoacetate – a tear gas

Lacrymator	A substance that irritates the eye and causes tears
MoD	Ministry of Defence (UK)
MP	Member of Parliament
NAAFI	Navy, Army, Air Forces' Institute
NBC	Nuclear, Biological, Chemical
NCPW	National Council for Prevention of War
NLW	Non-lethal weapons
NPCC	National Police Chiefs Council
OC	oleum capsicum
PAVA	pelargonium acid vanillylamide
PD	Police Department
PPE	Personal Protective Equipment
RCA	Riot Control Agent
V&AM	Victoria & Albert Museum
WWI	World War One (1914-1918)
WWII	World War Two (1939-1945)

1 Introduction

"All that is solid melts into air, all that is sacred is profaned, and man at last is compelled to face with sober senses his real conditions of life, and his relations with his kind." (Marx and Engels, 1848:4)

1.1 Background

From the fields of the Somme to the streets of St Louis, tear gas has caused pain, suffering and struggle from its conception to its present-day use. As a mechanism of control over the matter and materialities of being human - of taking on air, seeing clearly, breathing deeply, and moving easily - its pervious nature and pernicious permanence has untold effects. Allegorically it is a wolf in sheep's clothing, not non-lethal, not less-lethal, and definitely not non-pervasive. Its origins may have been ancient (Mayor, 2003), in the fire and brimstone of early warfare raged by the Greeks (Parker, 2008) but its exploitation is modernity realised - drawing on the 'higher form of killing' (Harris and Paxman, 1982; Preston, 2015) that a 'weaponised milieu' (Shaw, 2017:897) or 'hostile environment' (Pezzani, 2019) could wreak, tear gas use is a global, prolonged abusive relationship with a chemical weapon based on the gaslighting rhetoric that 'it is better to cry than to die' (Amery, 1965; Eardley-Pryor, 2014; Mankoo, 2019).

Tear gas begins - in its potential and pre-eminent state, as a solid, packed into canisters bursting with potential, pushing up against the confines of tangy metallic containment. When activated, by a pin mechanism and pressurising trigger, or propellant such as nitrogen, that solid form is aerosolised and dissipates - melting into the air, seeking out a path to the bodies it will affect. The precise nature of aerosolisation - dispersal without destruction of the substance - is tear gas's first transformation. Almost immediately afterwards it carries out its second act of influence and incidence: binding to the mucous membranes (the sweat, snot, spit and other excretions of human exertion) and targeting the nerves of the lacrimal gland, which branches off from the ophthalmic nerve and fifth cranial nerve. This process is both instantaneous and long-lasting, and whilst no potential further harm issues forth from the canister, which is spent and becomes consigned to the litter-based record of a place; the threat of the aerosolised particles as they attach and react to the essence of our beings - sweat, water, blood, alveoli - or circle in currents of the air, dispersing at

will to a wider vicinity, and lingering around the vastness of a space draws in the multiplicity of timescales of a tear gas deployment.

Once a canister has been opened and the chemicals within it used, there is no return - a body cannot be 'un-affected' by tear gas as easily as it can be sutured or bandaged and contained from injuries sustained by other police or military weaponry. There is significant literature suggesting the effects of tear gas use, especially repeated or compounded, are permanently, irrecoverably damaging to women and people who menstruate (Torgrimson-Ojerio *et al.*, 2021) though there is a dearth of literature concerning groups other than the traditionally homogenous scientific study cohorts of military personnel or police officers. Furthermore, the literature which does exist advocates for a "serious re-evaluation" (Brown *et al.*, 2021a:205) of the use of tear gas as a riot control agent, noting that there is a "lack of scientific evidence supporting the safety of tear gas, especially regarding its long-term impacts on human health and the environment" (Brown *et al.,* 2021a:205). It would not be ethical to expose pregnant people to some of the more rigorously conducted scientific research on the effects of tear gas, but it is equally unethical for police forces and militaries to be utilising a chemical weapon on a population that they do not fully understand the risk to, and one which has not been subject to rigorous scrutiny to confirm what the appropriate tactics are. The intersectionality within the composition of protest groups active today should be the first prompt to policing that all is not right with the premise of tear gas use on the general population based on research that understands the effects of its use on bodies which are generally young, healthy males (Torgrimson-Ojerio *et al.*, 2021).

Unsurprisingly, chemical lacrymators are also excessively dangerous to those with asthma, respiratory illness, and (as has emerged during the twin events concerning breathlessness during the course of this PhD - 2020's Black Lives Matter protests in America set amidst the global Covid-19 pandemic) impaired respiratory function. Vast swathes of the populations of countries such as the United States of America, France, Brazil, South Africa, Hong Kong and Palestine are over-exposed to the over-use of a chemical weapon that has rarely been subject to studies which could articulate the effects over a prolonged term on the bodies of those repeatedly exposed.

The codification of tear gas use as memorial objects, artwork, prose or poetry, immersive or interactive experiences allows for a novel and engaging route into exploring memory studies, and in reciprocation engaging memory studies permits a

route into exploring tear gas - through examining the object, and the longevity of the experience. Remembering tear gas use allows us to resolidify that gas - long past the point when it has reacted itself out of spluttering bodies awash with milk or at the cellular level, given over to protracted medical concerns. The artful memorial construction of tear gas use gives opportunity to (re)solidify the gas use into items concerned with its representation, which, with further curation, brings it full circle - once again a solid, to be examined and questioned. The 'real conditions' of Marx and Engels have everything to do with our understanding of violence, the relationship between state, police, civilian, body and machine, protest and authority — and still everything to do with our understanding of how this war weapon came to be the chemical of choice for preserving the peace and (re)making lawful order.

1.2 Origins of the project

This project has been borne from a significant interest in the gaseous, solidified by time spent in roles – though small and somewhat adjacent nonetheless – over the last ten years in both the UK military and UK policing. Whilst I am not a soldier or a police officer but an emergency planner, I have worked alongside them and indeed still do. This interest first brought me a degree of access into military environments and prompted an interest at undergraduate level in military geographies, in particular the place-making of military geographies, the relationship between conservation and destruction, as well as the sustainability of such deliberately shaped environments.

My progression to a Masters in Geopolitics and Security brought out an interest in disobedient objects. An engaging trip to the Disobedient Objects exhibition at the Victoria and Albert Museum, coupled with the assignment to present on the geopolitics of an object solidified my interest in tear gas, from the canister to the cloud. I spent time considering the distribution of tear gas deployments globally, searching for a pattern to their use - and finding one both temporally and spatially. Tear gas use is constant and determined by a number of factors, but there were observable peaks and troughs to its use that coincided with significant global, national and local events. Friday protests, for example, at small, annexed towns or villages in Palestine, were a venue for tear gas deployments by Israeli police officers and military personnel as if by clockwork. You could set your watch too, by the spike in tear gas use globally on May 1st, the traditional 'Workers' Day' or 'Labour Day' for strikes and demonstrations, particular in Latin America and across parts of Western Europe

(Yaprak Yildiz, Y. and Feigenbaum, A., 2018). These curious temporalities of tear gas also helped influence research regarding its specific geographies, and how tear gas could become emplaced and understood spatially.

This interest resulted in a thesis 'mapping' global distributions of tear gas manufacturers and users and allowed me the opportunity to pay close attention to the emergence of the Black Lives Matter movement, founded after the 2013 shooting of Trayvon Martin but brought to prominence after the 2014 shooting of Mike Brown. Territorially, too, there is a distribution of use, with hotter climates equating to more frequent use of tear gas. The efficiency of the chemicals in relation to the climate around them in question is one reason for this - as lacrimatory agents attach themselves to the mucous membranes and are frequently exacerbated by sweat, therefore the more you sweat the greater the effect of the compound. This potential spatial and climatic aberration was identified as a hazardous circumstance for tear gas use as one deployment during a training event led to hospitalisation of military personnel suffering acute pulmonary effects of their exposure due to it occurring on a hot day intensified by exercise (Thomas *et al.*, 2002). A number of approaches were considered, drawing on difference practical considerations as well as theoretical approaches, and the culmination of my project was a dissertation that went some way to exploring the historical sociology of tear gas whilst mapping its use in 2014.

The matter and nature of tear gas persisted as a topic of interest, with a view to engaging in further research, and thus this project was born. At an early juncture, it became apparent that there would be a challenge to be navigated in the form of my positionality, and involvement – or distance – with some of the subject areas, as well as the requirement to maintain a critical stance on aspects of police tear gas use which required confronting. Early discussions with my supervisors considered 'Could I take a stance, and how?' How can I speak, authentically, on the necessity to regulate or remove tear gas as a tactical option in the policing of protest when I know my colleagues and peers use pelargonium acid vanillylamide (PAVA, or Captor - the 'brand name' of our current incapacitant spray) with relative frequency and I'm employed by an organisation that retains that capability? I certainly haven't ever used CS or PAVA in anger, and it remains highly unlikely that conditions in the professional space of UK Civil Contingencies will ever be so bad that policing gives incapacitating agents to the same person who manages their Business Continuity Plans - but I am not

far removed from some of the same structures which have utilised tear gas historically and still have the power today to irreparably change the lives of people that they expose to, in effect, a banned chemical weapon. I have wrestled with this throughout and attempted to speak as authentically as I can, acknowledging where there should also be an opportunity to listen to other perspectives, including those who have been directly affected by tear gas deployment. By virtue of the thematic areas which my research design targeted, there are no sources of recollections or reflections on the experience of being tear gassed who have been subject to it by officers in the British Transport Police (BTP) other than the vignettes of my colleagues who have experienced its use during their training or operational duties.

1.3 What is tear gas?

One of most essential questions to clarify is also usually the first received when in discussion regarding this research, namely *'Tear gas? What's that?'* It is difficult to answer in a single sentence. There is much controversy swirling regarding the naming, and thus conceptualising tear gas, one which is ultimately responsible for the precarious position it occupies - outside of some legislative borders, rendered permissible by others, and even preferable in the biopolitical context that treaties and conventions have been read and remade. Throughout the course of this thesis there will be reflections on the naming of tear gas, and the context that it occupies, including how the classification of tear gas has played a hugely significant part in its proliferation and acceptability as a riot control agent, that which would not be permissible for use in warfare has been ideologically sanitised and is encouraged for use on one's own citizenry.

'Tear gas' understood through the etymological interpretation - a 'gas' which causes 'tears' - is not gas and does not only produce tears; but is named in such a way to reduce the verbal potency of its actual nature - for 'tear gas' sounds a lot less threatening than 'mechanically aerosolised powder to attack pain-sensing nerves'. Radding and Western posit that "according to lexical theory, a word is arbitrary: its sound and meaning have no intrinsic link; its function is grammatical. Names are, however, special words. We bestow names based on how they sound or on what they may already have come to represent; names are not arbitrary" (2010: 394). Rappert notes that "riot-control 'incapacitating' gases such as tear gas and CN can kill if used in confined spaces" (2003:ix). So, what of this *nom de plume*? This *nom de non-guerre?*

Tear gas by any other name would still have the same effect, surely? But would it, by any other name, be as accepted - be seen to be a viable, encouraged, acceptable method of disrupting protest, of dispossessing a citizenry of their one weapon - their voice - of causing prolonged, chronic and deleterious symptoms including respiratory distress (Arbak *et al.,* 2014), ocular injuries (Haar *et al.,* 2017), burns (Zekri *et al.,* 1995) and in many cases resulting in hospitalisations.

Much work has been done around the naming of 'non-lethal' itself, not least by Aftergood and Rosenburg in their article which argues that "the idea of non-lethal weapons is politically attractive and purposively misleading" (1994:45). Calling it tear gas is a misnomer, as "tear gases are nerve gases that specifically activate pain-sensing nerves. Spelled out like that, people can better compare them to other nerve agents out there. That's the major discovery we made, that they are not benign or just irritants" (Howard and Jordt, 2013). Tear gas by any other name would be of the same potency, of course; as four compounds form the overwhelming majority of all usage; however, it would be doubtless be less acceptable in the context of "less than lethal" (Sloane and Vilke, 2006:113) weapons if named according to its other intended symptoms.

Scientific literature has given us a classification of the 12 or so chemical compounds which attack the lacyrmal nerve or otherwise have lachrymatory qualities, i.e. they induce tears to be produced by irritating nerves and pain receptors within the eyes and sinuses. These are what is commonly understood as tear gas and show that there is variation between how the concept can be utilised or exploited in different situations, or under differing accords (Kumar *et al.*, 1995). The title 'tear gas' is a fateful misnomer, and "presents several paradoxes" (Eardly-Pryor, 2014:50). Firstly, it is often not a 'gas' at room temperature, but particles which are aerosolised, a "micro pulverised powder" (Eardly-Pryor, 2014:50) which draws in parallels with Zyklon B, Sarin, and other nerve 'gases' which exist in solid state at room temperature and are subject to far more stringent restrictions in international and criminal law (Crowley, 2016). There is fierce dispute that in the process of naming tear gas as a 'gas', an inaccurate and wildly downplayed understanding of its characteristics has been made and is promulgated. Unlike the gaseous slaughter of World War I and Sloterdijk's (2009) 'milieu', with chlorine and phosgene synthesised as liquids before being aerosolised, transported and enabled by the atmosphere, tear gas is actually a powder. This compound that is aerosolised as its dispersal mechanism, and then interacts,

reacting with and binding to the wet vulnerable surfaces on the body which constitute the mucus membranes such as the eyes, mouth, nose as well as reacting with sweat or moisture anywhere on the skin, the largest and most porous organ of all the human body. This powder derives its agency from being targeted and aerosolised, brought into being, and delivered unto the living environment of its target - like the vast clouds of chlorine which heralded the advance of German gas warfare and their dissent for heeding Article 22 of the Hague Convention; which were subject to wind and air speed, likely to dissipate, potentially even over one's own trenches, and became not only subject and object but useless and redundant without the alignment and fortune of prevailing atmospheric conditions.

Focussing on the five most popular and prevalent compounds which are used as tear gases allows for a deeper, more detailed understanding of their properties and potency, and begins to explain the status of their use and distribution globally. Tear gas' is an umbrella term for the chemical lacrymators 2-chlorobenzomalononitrile (CS), dibenzoxazepine (CR), phenyl chloride or chloroacetophenone (CN) as well as the pepper-based oleoresin capsicum (OC), and pelargonic acid vanillylamide (PAVA) (Carron and Yersin, 2009:338). As follows, CS, CR, CN, OC and PAVA will be considered as 'tear gases' throughout the duration of this research project; though always identified, if possible, by compound - in order to add clarity and allow for the examination in micro-trends of use. These are chemical compounds with lacrimatory properties, which can cause short-term, long-term or even fatal effects, ranging from crying, vomiting, skin irritation and temporary blindness to menstrual changes, chemical burns, respiratory distress and death. The principal harm is delivered through exposure of the chemical to the mucous membranes and then through to transient receptors and the lacrimal gland of the eye (Schep *et al.*, 2015) (Schwenk, 2018).

Starting with the most commonly-recognised and utilised of the 'tear gases' CS, or 2-chlorobenzalmalonitrile ($C_{10}H_5ClN_2$) to use its scientific name, is a white crystalline solid powder when pure, first synthesized by Corson and Stoughton (and therefore bearing the initials of their surnames) in 1928, though it was developed and adapted further in the 1950s to have a stronger effect but less toxicity than CN gas (Hu *et al*, 1989) (Ballantyne and Swanston, 1978:76). CS is found as a powder and then aerosolised for dispersal in a smoke cloud, or alternatively as a liquid when dissolved with a solvent methyl iso-butyl ketone in order to be utilised in 'spray' form. "CS is a

potent lacrimator and is the least toxic of the chemical compounds" (Breakell and Bodiwala, 1997:56). CS was an attempt to make a more stable and effective version of wartime tear gases or tear smokes, and resulted in the compound being widely disseminated and replicated. It is almost certainly CS deployed when accounts of militaries or police forces utilising tear gas emerge in the media or on social media today, as it is both the most effective and widely produced, and forms most of the current worldwide deployment of 'tear gas'. Some UK Home Office police forces maintain CS capability in line with Public Order doctrine on its use and handling.

Typically, "exposure to CS aerosol (orthochloro-benzylidenemalononitrile) gives rise to almost instantaneous conjunctivitis and respiratory sensations, including burning in the throat and pain and constriction in the chest" (Cotes *et al.*, 1972:199) and irritation of the eyes and mouth can last for up to ten hours. CS is not typically considered to be fatal, however has been a factor causing death or serious injury, particularly in cases where it is utilised in confined spaces. For example, some of the deaths in the 1993 siege on the Branch Davidians in Waco, Texas, were attributed to the use of large amounts of chlorobenzylidene- malononitrile in a confined space. (Carron and Yersin, 2009:338) (Smith and Greaves, 2002) (Sandford, 1976). Effects of CS use commonly result in "difficulty in breathing, chest tightness, … choking sensation … severe eye symptoms" such as the cases of twenty-three persons exposed to CS gas at a nightclub in Leicestershire (Breakell and Bodiwala, 1997) as well as this non-exhaustive list of symptoms including "lacrimation, pain, blepharospasm, conjunctival erythema, and periorbital oedema … discomfort in the nose, a burning sensation in the mouth, nausea and vomiting, and respiratory symptoms of a sore throat, tight chest, coughing, bronchospasm, and occasionally laryngospasm" (Breakell and Bodiwala, 1997:57).

As mentioned above, CS's stronger sibling is CN gas - phenacyl chloride or α-chloroacetophenone (C_8H_7ClO). This is a white-grey crystalline substance, a solid at room temperature, that is not soluble, in contrast to CR. CN is characterised as having a very distinctive gaseous form, described as "pungent and irritating" to smell (NIOSH:2011). It has a significantly higher toxicity than CS gas and has been implicated in causing multiple fatalities, mostly from causing an exposed person to develop respiratory issues such as pulmonary oedema. High concentrations can cause corneal epithelial damage (Quiroga-Garza *et al.,* 2023) and chemosis (Ballantyne and

Swanston, 1978:76). CN is occasionally connected to studies of deaths and serious injuries following tear gas exposure, and can have serious degenerative effects on the eye (Scott, 1995:871) (Kim *et al*., 2016). The range of symptoms, from syncope (fainting), allergic contact permanent dermatitis, corneal damage and chemosis show the significant detrimental harm that CN can cause, up to and including over five deaths which are known to have occurred due to CN use, challenging the definition as a 'non-lethal' riot control agent (Blain, 2003). Like CS, it is also combustible, and that combined with its excessive toxicity and the slower mechanism of dispersal, makes CN a less desirable compound for riot control than both CS or pepper sprays including oleum capsicum (OC) and its variants. It should be noted that CN is not an approved compound for UK police or military use.

A forerunner of CS is CR: dibenzoxazepine (C13HgNO), nicknamed 'firegas' (Rosenhead, 1981:212) was developed by the British Ministry of Defence (MoD) in 1962. This substance is pale yellow in appearance, being a yellow crystalline micro particulate, and is characterised as being solid at room temperature, soluble and with a peppery odour. Being soluble, early developmental tests posed the option of utilising CR alongside water cannons for a heightened crowd (or mob) dispersal capacity, where the effects of the compound would be exacerbated by water. It is six to ten times more powerful than CS gas, and can remain active in the environment for up to 60 days. Legal structures including that of the United States of America categorise CR as a "combat class" chemical weapon and do not authorise its use as a tactical option in riot control scenarios (Hoenig, 2007), however it remains a manufactured substance by factories both in the US and worldwide.

The term tear gas can be extended to the family of pepper sprays based on oleum capsicum (OC) which utilises capsaicin - the active ingredient in chilli peppers - and other natural or synthetic derivatives such as Captor, a brand name of pelargonium acid vanillylamide (PAVA) used by policing and military actors across the planet, although the two are frequently incorrectly conflated in media efforts. OC is a compound made with capsaicin, sometimes referred to as capsicum. This ingredient is manufactured further by being suspended in water by an emulsifier such as propylene glycol, and then pressurised so that it can be delivered as a dispensable liquid for use. When sprayed, the resulting liquid binds to the capsaicin receptors in our bodies, which gives the sensation of heat - and the pain. Pepper spray is a deliberate

dose of a spice that would be unpalatable to even the most experienced and dedicated chilli fanatics (Yang and Zheng, 2017). Pepper spray is a popular self-defence tool, particularly in North America, and particularly gendered. Canisters of pepper spray are frequently referenced culturally as a woman's weapon - 'handbag-sized' for women who travel, live or socialise predominantly alone. The films Wind River and The Last Seduction all feature pepper spray use with a gendered edge, though the latter almost alarmingly so, uses it as a murder weapon for Linda Fiorentino's femme fatale (Barancik, 1994).

UK police forces have phased out CS for personal issue, favouring instead PAVA which can be used alongside other issued Personal Protective Equipment (PPE) such as TASER - a Conductive Energy Device (CED), and is more potent directly to a person than CS (ACPO, 2009). A form of PAVA is currently issued in two main forms (Captor I and Captor II) to the 47 police forces across the United Kingdom, as well as extensively circulated in the US and western Europe. The use of PAVA in the UK is subject to holding the office of a warranted Police Constable in one of 44 police forces; and passing yearly competency tests including simulated exposure to the spray. CS remains, however, a tactical option for large public order scenarios, where the blurred lines of police militarisation and the rise of the 'warrior cop' (Balko, 2013) have necessitated the retention of an option where it can be utilised by police officers alongside other protester dispersal or removal tactics in open-air environments. This is where, certainly in the last 20 years, we have most commonly seen tear gas utilised by UK's policing services, as a "dispersion control agent" (Brown *et al.,* 2021b:1) though not without attracting significant controversy as a technique of colonial control re-introduced to British police forces during a period of militarisation (Linstrum, 2019). However, the experience of British protestors or persons who have been 'sprayed' by UK police officers utilising PAVA as part of their Personal Protective Equipment (PPE) may differ to that of any other country in Western Europe, let alone globally, where CS use is far more prevalent and causes far greater harms.

'Tear gas' is a term bearing such oxymoronic weight that it deserves unpacking itself. The juxtaposition of the words makes for a strange term, in that both words bely so little of the wider context of the item itself; rendering it as something which almost sounds innocuous, an outlier to the threatening nature of other gas weapons and the imagination of the 'terror from the air' that they conjure. 'Tear' leads us to think that

there is nothing more to the effect than crying - a natural response that causes no significant consternation. Faced with the potential that a weapon would be used upon me, 'crying' would be the 'least worst' effect, when compared with the spectrum from cuts to bleeds to burns to breathlessness. It suggests, via the gentle nudge of etymology, that 'crying' is not a bad thing, certainly not a detrimental outcome upon exposure. But 'tear' doesn't even begin to expand upon the spectrum of effects of lacrimators: burns, respiratory distress, choking, blindness, bruising (from the canister - usually when fired at directly at a target) and the helplessness of more evocative language that would outline the struggle to take in air, the terrifying notion of being breathless. "However, in defining chemical agents according to their lachrymatory properties, as is the case for 'teargas', one foregrounds particular effects while backgrounding others. Many forms of teargas produce respiratory irritation and pain or skin irritation, for example. Nevertheless, as they all share the effect of temporarily blinding through lachrymation and because their effects are ostensibly temporary, these various agents have come to be classified and understood as teargases in common parlance" (Mankoo, 2019:23). Research regarding the other harms that teargas can cause notes the prevalence of physical violence - the shock of a canister hitting a person's head or chest can contribute to serious physical trauma - as well as the collateral damage it causes on those suffering from pre-existing conditions or being pregnant. The harms of an atmospheric attack being delivered upon the bodies of protestors or bystanders - for there is no differentiation in targeting - run a far wider and more alarming spectrum than simply causing tears, as the name suggests.

It also fails to bely the context of being both gas, liquid, and solid. The name, which has stuck despite its mischaracterisation, only speaks to a third of the elemental characteristics, and only one of a significant number of bodily effects. "In more recent British contexts, toxicologists have designated CS (the most widely employed teargas today) as a 'particulate spray' rather than a gas." (Mankoo, 2019:24) so our gaseous characterisation and the imagery of exploration of the sensory characteristics of tear gas requires rethinking. For a chemical compound that looks like a clear, colourless liquid or powder there may not be many depictions or much meaning that can be inferred from the physical appearance of CS or other variants before they are aerosolised under pressure, usually by a canister that contains a small charge utilised to activate the release of the gas. Maybe 'projectile filled with explosively released compound that attacks the lacrimatory nerve and can result in permanent damage to

both physiological and psychological health' is too much to fit on the bottle. So thinks Amnesty International, which has joined "the UN Special Rapporteur on Torture in equating the use of tear gas in certain situations as amounting to torture or other ill-treatment" (Amnesty International, 2020) as well as to challenge it proliferation, misuse and normalisation, alleging that the use of tear gas, in particular CS, by militaries and police services globally amounts to breaches in international regulations on chemical weapons.

The definition of tear gas prompts controversy alone, without even considering the threshold for its use and variations in governance. To summarise, and to ensure this thesis speaks to the broadest potential set of sources, five compounds are considered tear gases by most contemporary medical and scientific arbiters of the subject: CS, CR, CN, OC and PAVA. I will naturally come to focus on CS as the most prevalent in use and with the most reactionary data attributable to its use.

1.4 What isn't tear gas?

I am further clarifying the above, and will not be using the term tear gas to apply to any of the other organic or chemical compounds with lacrimatory effects which were developed during the 'Chemists War' (Schmidt, 2015) such as adamsite, chemical name Diphenylaminochloroarsine (DM) which is strongly believed by researchers to have been utilised in 1919 by the British in Russia (Jones, 1999), or bromoacetone (BA) a far more toxic riot agent than would be viable for use (Levene, 1930), or indeed any of the family of vomiting agents or sneeze gases such as chloropicrin or diphenylcyanoarsine which were developed in WWI (Gilbert, 1995) and by now are far superseded in their distribution and use.

Making this distinction throughout is important, as we will be focussing on tear gas in this thesis, by means of further zeroing in on CS gas use by police through the majority of the empirical chapters as both the most widely utilised and widely understood compound. Being precise and deliberate when describing tear gas is often a difficult undertaking, as the term has applied to numerous compounds, mechanisms, tactics and effects since it entered use over one hundred years ago.

Understanding what tear gas means is essential to setting it apart from other war gases or nerve agents. The former interfere with other receptors, and the latter

targets acetylcholinesterase and can be treated with atropine. Taking someone who has been exposed to tear gas and treating them with atropine and adrenaline could be fatal, just as taking someone who has been exposed to nerve gas and treating them with copious amounts of water would be pointless (Kaszeta, 2023). Where confusion circulates and is often amplified by misinformation-driven accounts on social media platforms wishing to equate tear gas with nerve gas, it is an important distinction to make on the basis of understanding the legal and political context of both weapons, as well as the situating of such exposures in contemporary geopolitical struggles.

1.5 The research question and objectives

The research question that this thesis aims to explore is concerned with the nature and impact of the vicarious experience of tear gas use, asking firstly to qualify it: what the human experience of tear gas use is, by exploring how it is represented, and then secondly to quantify the impact of this through an examination the implications of that vicarious experience – for legacies of memory or memorialisation.

The objectives of the research were aligned to the split element of the research question thus: gather enough data to be able to understand and unpick the precarious nature of the experience of tear gas use, and then utilise that data in conjunction with the rich literatures explored in Chapter 2 to bring forth the overriding implications of the use of tear gas, particularly in how the last one hundred and ten years of its existence and proliferation has built and shaped the legacy consciousness of a chemical weapon in the minds of those who may be subject to it.

The volume of tear gas deployments around the world made it difficult to directly focus on even a proportion of the examples of its use, especially over a period of seven years part-time study encompassing a number of significant protest events and movements, so a small but broad range of sources and examples from three roughly-defined time periods have been collated to form the empirical chapters. Once the identification of tear gas uses on a geographical or temporal basis had been completed, examples were sought of how that tear gas use was recorded, for the purpose of being remembered, commemorated, venerated or held to account. The multitude of mechanisms by which tear gas use was recorded - paintings, poetry, installations, murals, photography and prose, even that which is contained in the spaces of social media platforms such as Facebook, Instagram or X (Twitter) meant that there

was a richness and diversity to the narratives which are told about tear gas use - how it affected, afflicted or aggrieved the people who it was used by or on, and how they were able to conceptualise that experience into retellings.

1.6 The justification of tear gas use

In answering the central research question, evidence is put forward that tear gas has always been a heavily racialised weapon against dissent, liberal political viewpoints, freedom of movement and gathering. We are shown examples where tear gas use becomes a central facet of conceptualising how bad or how protracted a protest or demonstration became, where it is deployed before control is lost and the connections between participants and police are irretrievably severed, degrading into violence. We are shown examples of how tear gas use can be conceptualised as a traumatic occurrence within a retelling of protest activity and how it may compound the initial trauma behind a protest occurring. We are shown examples of how tear gas is solidified around and becomes central to the understanding of power relationships between the people who use it, and those it is used on. We are shown examples of how tear gas is poorly understood by those who use it, inexpertly deployed with devastating consequences, and instead it is activist networks and citizen scientists who develop and share the most effective mechanisms of countering its use, as well as the strongest arguments for its withdrawal, along physical and mental health grounds. We are shown how gas use establishes a dominance, a state or authoritarian power, and how this is reacted to by art, poetry and prose, within and exterior to conventional print media, as well as frequently being discussed and unpacked on new, social media.

I set out to do this to explore whether tear gas is a justifiable mechanism to utilise in attempts to create or restore public order; not from researching the pharmacological effects, but from a new and under-utilised angle interested in the affective atmospheres of tear gas use and the characterisation of its experience. This showed me that there are profoundly significant issues with tear gas use globally on us all which resonate through the ways it is remembered and discussed after the experience. Will we look back on police chemical weaponry with the same disdain and cruel and unusual medieval punishment - does tear gas use on a crowd of protestors who are - as a body - may be peaceful until their assemblage is declared otherwise, feel as indiscriminate and untargeted a practice as dunking a woman to see if she floats? Concern about how violence is justified and utilised as a mechanism of state and police

control runs through this thesis, with the central argument of how disproportionate tear gas use may be at large: agitators or people committing offences within a crowd of protestors require a method of intervention which is targeted, rather than one variable with the wind. Even the very authorities trained and drilled at utilising tear gas find themselves subject to accidental or neglectful exposure with negative consequences, such as in the case of eight thousand US soldiers accidentally tear gassed during what was supposed to be a 'morale-boosting' event honouring and re- enacting a Vietnam War battle (Graziosi, 2022). Exposed troops fled, crying and choking, from the open area where CS had been used incorrectly to define the boundaries of an assault course. This example shows that there are perils with even the most controlled and governed use of tear gas: by the military-on-military personnel. Thus, the significance of the danger it poses civilians – untrained, unprotected and potentially unprepared – can be extrapolated and becomes apparent.

1.7 Why is this work important?

Tear gas is still significantly under-studied. The worldwide span of its deployments and what the complex arrangement of actors and networks can tell us about global hegemonies of power is not subject to as intense an interrogation as other weapons or conflicts. The scientific and technological impacts of tear gas is, too, under-studied, and woefully belies a bias to scientific literature which has neglected the compound and complex dependencies of bodies other than a 'norm'; there being a paucity of research reports utilising sample populations of elderly, disabled, pregnant, young or female. The *de facto* sample for most tear gas studies which use serving military or police personnel is very unlikely to include those groups, or other intersectionalities. With increasing anger regarding the risks it presents to people who menstruate and people with underlying health conditions, there are arguments that there should be a reckoning in scientific literature regarding just why tear gas is utilised on bodies that have not been studied to fully understand the breadth and severity of its effects.

However, there are two recent and expansive works on tear gas to acknowledge however, which have been published during the course of this project and which have been invaluable in the course of my research. First, Anna Feigenbaum's historical anthology of tear gas, from its development, early utilisation, to its global proliferation, brought her aim "to put tear gas on trial" (Feigenbaum, 2017:11) to the fore. The precision of her lens which unpicks the key players in its development, their arguments

and the necessity of gas in modern policing made for a powerful text to engage with. Feigenbaum looks holistically at the global tear gas business, as well as those who resist its occupation and use. She contrasts those who protest with those who profit, and by examining actors and networks shows that the evidence against using tear gas most strongly outweighs any justification for it being permissible under chemical warfare legislative frameworks in the first place.

Secondly, Alex Mankoo's thesis which blended historical sociology with the addition of the technological and scientific literature and a fascinating pathology of British governmental and military intervention tied up with studies of the effect of Empire. Examining the pervasive impact of British colonialism, particularly in the Indian sub-continent, Mankoo looks at the user case for tear gas from a different perspective whilst still being able to fervently conclude that it is a weapon of state and imperial control that does not stand up to the justification. Mankoo asserts that tear gas was developed and practiced, subject to regular repositioning and affected by passing, fluctuating political and social tides as well as the fundamental nature of British (and empire-bound) society's relationship to imperial militaries.

This project benefitted greatly from those seminal works that have been recently published, with Feigenbaum's book released in 2017 and Mankoo's thesis published shortly after being received in 2019. There is much that is covered by Feigenbaum and Mankoo's studies - themes of violence, power, safety and security, as well as the illicit contracts hidden from public view that persist with the production of harm as part of a global network of weapons proliferation. I have engaged with some similar case studies to Mankoo and Feigenbaum, albeit with a differing lens due to the research questions I have asked. The fields of Flanders, the barricades of Bogside and the streets of St Louis all provide a bold and engaging research landscape, however there are new emerging tear gas battlefields on almost a daily basis. New work on tear gas is thus still important, even with the contribution that has been made in recent years.

Tear gas use on civilians has occurred for over a hundred years. During that time, exceptional advances have been made in both the design and development of weaponry, police tactics - in particular for policing disorder - as well as the relationship between suppliers and governments, with tear gas proliferation often acting as evidence of the parasitic relationship between militaries, governments and the private

sector. However, the work of Feigenbaum and Mankoo provided the foundation to understand the subject but also a point of departure to begin considering alternative ways to conceptualise tear gas, utilising different theoretical and methodological approaches, as will now be detailed in setting out the structure of the thesis to come.

1.8 Structure of the thesis

This thesis begins with a review of the literature, which offers historical and contemporary sources that attempt to make sense of tear gas, as well as beginning to engage the research questions, through exploration of geographies of violence and memory. Postmemory is a key concept which is detailed extensively in the literature review as Northern Ireland and the lasting violence of The Troubles has proved a fertile ground for geographers interested in postmemory, especially regarding the spatial geographies of such a construction; which tear gas use provides a lens on. Violent geographies too, are a single thread which runs through the assembled literature, drawing together accounts of power, in particular biopower and biopolitics, with the empirical examples of its use. An explanation and literatures of thanatopolitics feature heavily, in the production and civic epistemology of tear gas, as well as informing narratives of mourning and commemoration. Tear gas is a disobedient object, tangled in amongst political and violent geographies, so the literature on these topics is naturally forefront in my second chapter. This looks different in the US context, where again tear gas was subject to the wavering effects of neoliberalism and marketed explicitly to policing agencies. The review of the literature, and the empirical chapters which follow, contain examples from over a hundred years of activity. Most crucially, with 2022 being the 100-year anniversary of tear gas being used on a civilian population in the United States of America, it is an important time to reflect on what can be learned from the vicarious experience of others, marking a centenary of violence with a weather eye on the future exploitation of tear gas.

Moving on, the empirical element of this work will consist of three chapters, which will examine the evidence of how tear gas use is presented. The main body of this work uses a broad range of sources, from photography to poetry, murals to movies, to characterise, situate, and reflect on the experience of tear gas use. There are cross-cutting themes found within each chapter, as well as adversarial relationships or dependencies which are observable at each of the time periods examined. After the sources were gathered, as detailed in the methodology chapter, the process of coding

them brought forth a number of dependencies and differences, prompting a change in the structure of the empirical chapters from chronological sorting to thematic. However, three distinct time periods associated with the sources do still remain - the use of tear gas in World War 1, in the late 20th Century in Northern Ireland, and in contemporary protests particularly networked throughout the United States of America, Palestine, and Hong Kong. These phases moved from nascent understandings of the new chemical weapon that are now outside our living memory, right the way through to contemporary accounts as tear gas use passed its hundred-year anniversary. Conceptualising the adversarial relationships within each chapter; including the militaristic, the post-colonial, and the construction of public order (or disorder) policing in contrast to those who were affected by the activity of those structures afforded an opportunity to examine the influence of tear gas across its entire period of existence.

Throughout this thesis the reflections have offered a mechanism for entering not only the arguments around governance of chemical agents, in particular tear gas, but also a lens to view our collective understanding of what tear gas use means for us; ordinary people who may find themselves in the wrong place at the wrong time, protesting, practicing our religion or engaging in sports and cultural opportunities, working or playing.

The reflection and conclusion sections assert that vicariously experiencing the impact of tear gas use on humans is a seminal opportunity to reflect on the necessity of it as a police or military weapon. As a mechanism for dispersing protests, as the empirical show with their examples of tear gas use across global protest movements, it is woefully temporary, yet causes permanent harms. The conclusion makes the fundamental argument that tear gas is not only inaccurately understood, but inaccurately utilised, as well as being represented as a deeply complex, uncomfortable, unnecessary and traumatising experience for those who experience it. Their cautionary tales, when viewed collectively, provide an unequivocal narrative that tear gas use in the modern age is flawed, problematic, traumatic and should be rethought. The conclusion chapter also gives a valid opportunity to reflect on the research process, to offer thoughts on the limitations of this research, and ponder where the next research interventions or directions into tear gas will be necessary.

2 Review of the literature

"To begin at the beginning. It is spring, moonless night, starless and bible black…" (Thomas, 1954:1)

"The 20th Century dawned in a spectacular revelation on April 22, 1915…" (Sloterdijk, 2009:10)

2.1 Introduction

What can representations of tear gas use tell us about the experience of being subjected to it? There is a past to tear gas, which can be understood through archives, museums and accounts and a present to tear gas, which can be explored through those who live it - the practitioners and protesters. However, there is still much to learn from the subjects which swirl around tear gas use. This literature review will span a number of themes and approaches within geographical writing, also drawing heavily on sources relating to history, medicine, politics and the creative arts. The intention is to outline the current theoretical context of tear gas, as well as to situate it within already established conceptualisations of violence, governmentality, and memory. Whilst the aim is to explore the current work on tear gas as an object, there was also the opportunity to see what work could help open up the subject of tear gas, allowing a new way in to understanding its agency and materiality, as well as how it exerts influence.

Central to the literature is the exploration of themes of biopower and thanatopolitics, postmemory, and geographies of violence, which provided a theoretical foundation to employ when approaching the collection and analysis of data utilising feminist, slow, reflective approaches which will be discussed further in the chapter dedicated to methodological decisions. The practical evidence present in contemporary scientific literature as well as news media will also be incorporated, and as well as some of the atypical conditions of use which are arrived at through the enacting of extra-governmental or even tyrannical governmental powers, especially in regions subject to contentious control such as border areas or disputed territories like the 'no-man's lands' of Palestine.

2.1.1 Structure of the literature review

In this literature review the development of tear gas from early trench warfare

compound into the popular riot control agent (RCA) used by contemporary police forces and militaries today will be charted. In laying bare the history of a weapon contested and yet more controlled than most, there emerges a clear dichotomy relating to the source and stance of available literature: whereby state actors, militaries and police forces using tear gas who believe it to be not only effective but essential stand in direct contradiction with non-state actors, protest groups, and individuals affected by tear gas use who constitute an opposition through their examination of the deleterious effects and humanities of the effected / affected. The literature review aims to probe understandings of tear gas through the themes of governmentality, environmentality, social security and legality.

There is an emerging difference in core themes in literature concerned with the use of tear gas - the scientific - which seeks to contextualise empirical research of the effects (intended and adverse) of tear gas upon the human body and the environment without offering political commentary on its use, and the critical, feminist geographical approaches which seek to add understanding and criticality to that detail of symptoms in its examination of why tear gas is deployed, and its effects in totality, not just on the isolated body, but as indicative and emblematic of a multitude of forms of violence which lead to the deployment occurring in the first place. However, this duality is not yet fully formulated and without significant work in the next few years, will leave issues around tear gas use languishing. A middle ground is certainly needed, to represent the critical analysis of tear gas misuse alongside empirical research regarding its potency and effects. “There are debates surrounding the acceptability of tear gas use for riot-control purposes, especially in the background of the recent massive use. Many believe the risks of tear gas exposure are understated and that perceived risks are based on insufficient human epidemiological and mechanistic data” (Rothenburg *et. al*., 2016:96). Clearly, there is a long way yet to go in enhancing and broadening our understandings of these compounds we call tear gas.

This literature review will begin with sections focusing on the development of tear gas use, having identified a number of historical and sociological sources. The fullest anthological understanding of tear gas’s development comes from Thomas Faith, chronicling the Chemical Warfare Service of the US Army, and Anna Feigenbaum’s work charting one hundred years of tear gas use; though in particular her chapter on War Gases for Peacetime Use (Feigenbaum, 2017). This will then move

into exploring concepts of power: whether biopolitical, thanatopolitical or violent. Tear gas is ripe to be constructed within understandings of sovereign power; that which troubles the distinctions between living and dying, as Nieuwenhuis articulates: "NLWs" [non-lethal weapons] constitute an abandonment of biopolitics and the start of thanatopolitics" (2015:514). Drawing on a rich seam of literature regarding atmospheres and affect aids the exploration of tear gas's effects in and on environments – bringing forth Sloterdijk's ideas about atmoterrorism, aerographies, the origins of gas warfare and environmental explication. An approach to security and power follows, making study of security and governmentality, considering the role of state power in tear gas use, of spatial securities, of the militarisation of the police, and of the state of exception to also explore protest and tear gas use. Latterly, this literature review moves on to consider work regarding role of remembering, incorporating sections investigating memory geographies and postmemory. In conclusion, I offer my thoughts on where tear gas sits, or troubles, themes within contemporary human geography, and what the literature means for the investigations yet to come in this project.

2.2 A weapon as old as time - miasmas and Empires

The historical origins of tear gas, amongst other chemical weapons, lie in the 19th Century with a turning point of scientific combat - a melding of the militaristic with the modern - where strategic advantage was sought from new and increasingly technical mechanisms. There is an archaeological record of the exploitation of chemicals, smells, airs and miasmas taking us back to pre-Roman siege warfare. Smoke; acrid and pungent, was long used to deny space or to make occupation of buildings and towns untenable, a technique proliferated by most pre-modern armies through siege warfare. Gas has been utilised as a weapon, that is, a tool to bring harm to the body for the advantage of one person or group over another, from as early as Ancient Greek times (Krebs, 2006). Bodies, when left to decompose, or burnt to release noxious and unpleasant smells, were popular early siege weapons (Parker, 2008) that would compromise the miasma, the air around a given establishment, as well as poisoning water supplies, often to towns or cities which were dependent on a handful of water sources, holding entire cities hostage with their foul perfumes and volumes. Harnessing power over the fundamental, elemental components of life on earth - air and water - is therefore not a new phenomenon or desire. Sulphur, a naturally occurring-element with that unmistakable smell of rotten eggs, was found naturally occurring in areas of volcanic activity and then once understood and harvested, could

be harnessed as an additionality to battles across Eurasia; the foul-smelling smoke produced when burning lime were used by medieval forces across Western Europe (Coleman, 2005) and by the Chinese (Parker, 2008). As Diana Preston notes, "the Spartans used sulfur fumes … Sassanian soldiers burned bitumen and sulfur … Christian defenders of Belgrade used a toxic cloud said to contain arsenic … the Taino Indians of Hispaniola hurled gourds filled with ashes and ground chili peppers at the invading Spanish to create a stinging smoke screen" (2015:23).

It could be argued that all elements are involved in this process of weaponisation and advantage-creating: fire, water, earth and air. Air, however, proved the most mechanistically difficult to weaponise, relying on advances in technology linked to industrialisation and modernity. It was also the latest to be weaponised, with wars fought territorially (on land, utilising geological features to advantage / disadvantage) and then from the 17th Century onwards utilising the hegemony of the sea, with major naval powers such as Britain, Spain and the Netherlands contributing to the colonisation of the globe.

The weaponisation of gas in warfare had two main origins. The first, enterprising scientists and soldiers, having heard of the frequency of the use of gas in warfare, thus sought to weaponise it further. The second - incidental discoveries of new technologies by individuals or research clusters leading to a surge towards that discovery as a means by which a strategic and tactical advantage could be taken and capitalised upon. The burning of materials to produce harmful gases was a feature of warfare right up until the Scientific Revolution where the capacity and capability to synthesise these source chemicals became an interest of soldier-scientists. Webster's Timeline History of Tear gas records the earliest use of tear gas in its first page: in 178CE, "Chinese use tear gas (lime smoke) to suppress peasant revolt" (Parker, 2008:5) and then makes a huge leap - the next entry is dated 1914CE. Technologically, tear gas use was possible via those pre-modern mechanisms, but it was at the end of the 19th century that attitudes to weaponry shifted, alongside developments in organic chemistry. Whilst reports suggest precursor chemicals or variants were in use by the British in the Boer Wars and by the French policing and Russians in the late 19th Century, it is World War I where most of our understandings about the potencies and possibilities of tear gas begin.

The earliest development of tear gas had resulted from French chemists' efforts, at the turn of the 20th century, to develop a new method of riot control while maneuvering around international treaty restrictions imposed on 'projectiles filled with poison gas' by The Hague Convention of 1899. Using xylyl bromide, amongst other compounds, the French were the first to develop tear gas grenades for some limited policing use, which had significant impact on the French military ability to use tear gas in the early few months of World War One; the police-issue agents were simply weaponised by concentrating the formula, and enlarging the dispersal mechanism - from hand grenades that were personal issue to gendarmes - to shells which could be exploded at will. Policing in the UK borrowed from multiple sources, with frequent cross-pollination of ideas from Western Europe. Therefore, policing and military historians have established that conceptually (and in the case of some isolated force capabilities) physically, tear gas was part of the arsenals of the UK, France and Germany prior to the outbreak of WWI, and at the eve of hostilities. Whilst the United States was not to join the European theatre for a number of years, they too had access to early forms of deleterious gas - at the very least, forms of tear gases, as a poison that would have deleterious effects on enemy strength, organisation and morale. Heading into World War I, all main combatants were researching the use of gas as weapons in some form, having been made aware of other nations contributions to the scientific understanding of atmospheric weapons through conferences such as the Hague Convention and 1899 Declaration, and processes of testing publicised henceforth among scientific communities. Indeed, it was the relative safety of communities of chemical, biological and later nuclear research which provided the first proving grounds for ideas about their theoretical use as weapons.

It was the later technological development which paved the way to weaponise poison gases, not just tear gas, for use in conflict which marked a monumental turn, a hegemonic shift even, in considerations of warfare, control, power, targeting, and the environment. The nuance comes from understanding the difference between a deleterious substance being released - and left to disperse on the wind, and, depending on the specific terrain and atmospheric conditions, either ending up affecting the enemy or the source; versus the addition of a chemical to a projectile, which would disperse and aerosolise upon the detonation of a charge or impact in a given area. One became permissible, the other prohibited. Gas warfare revolutionised understanding of the body too, and of how the new molecular milieu became fatal: these 'lethal mists' of

"greenish cloud gliding relentlessly across the trenches… sinister and deadly" (Richter, 1992:1) were capable of the most powerful acts of control and subjugation over the singular, weakened, human form.

2.2.1 To begin at the beginning - development of tear gases

I paraphrase both Dylan Thomas and Sloterdijk in this conception of the first tear gassing: in the beginning it is the spring of 1915, and the French are mired by a German offensive near Ypres. The "'specially formed German 'gas regiment' have launched a large-scale operation against French- Canadian troops in the northern Ypres Salient" (Sloterdijk, 2009:10), although it is tacitly accepted that whilst the Germans carried out the Ypres attack popularising tear gas use, it was the French who had first attempted to harness this new environmental explication - developed through exploration of siege-breaking mechanisms in connection with policing authorities conscious of revolutionary lessons (Krause, 2013) - in a somewhat less-than-successful assault on German trenches in 1914 with grenades tainted with methylbenzyl bromide (Feigenbaum, 2017) and frequently used field guns to disperse asphyxiating gas shells. French efforts are discussed far less due to the predilection of Anglophone sources regarding gas warfare in World War I, but draw attention from Ludwig Haber (grandson of Fritz Haber responsible for early developments in theoretical gas weaponisation) (Haber, 1986) as well as authors taking an anthological approach to gas warfare (Moore, 1987). This early tradeoff between the French and German powers utilising their newly developed capacity and capabilities set in motion the trading of tear gases between trenches during 1914 and much of early 1915, with eyewitness testimony speaking about the "asphyxiating gases… which affects the throat and eyes and makes us cry" (Zanders (ed.) 2016:75).

To those on the front lines, it becomes clear that the 'taboo' of gas use was not going to curtail its exploration or adoption in the battle spaces that they find themselves in. Indeed, despite such overwhelming opposition, in 1915 the new weapon is about to come swirling into the consciousness of global war, and herald with it the harnessing of modernity, exclusively for the peril of mankind, and begin our complicated relationship and understanding of chemical lacrymators and their place in society (Richter, 1992) as well as a geographical reimagining of how humans condition spaces, or vice versa. With modernity characterised as "air conditioning" (Sloterdijk, 2009:20) the atmospheres of the First World War became representative of the medium of "slow

violence" (Nixon, 2011:2) where a fragmented atmosphere perpetuated environmental inequality (Sloterdijk, 2009:99), and thus the 1920s became the golden age of tear gas (Feigenbaum, 2017), although at the time of writing, the 2020s are a strong competitor to that title.

A hundred or so years later, tear gas still perpetuates those same inequalities as first experienced on the fields of northern France and Belgium, with its use on citizens (not combatants, this time) visibly and insidiously challenging our understanding of, reliance on, and affection for ventilated outdoor spaces which became new battlegrounds during the Covid-19 pandemic. Miguel de Larrinaga situates tear gas firmly "as a technology of governmentality - that is, as an object that is produced by assemblages of particular forms of power that concurrently contributes to making particular forms of governance possible" (2016:523) echoing Anais (2011) and her exploration of the paradoxes that permit tear gas to exist, having emerged from a dearth in the literature exploring "why non-lethality came to be understood as a desirable property of some weapons" (Anais, 2011:538). The detail of the dichotomy of tear gas use examined today versus in the early 19th century however is with regards to the intent of its use: "during World War I tear gases were generally used to get people out of trenches so that other forms of gas or artillery fire could be used on them" (Feigenbaum, 2018), though now tear gas is a standalone event in terms of its deployment on citizens, rather than combatants.

2.2.2 The fog of war - World War I and gas use

France was the first power in World War 1 to use 'tear gas'- a combination of Xylyl bromide and ethyl bromoacetate; both colourless liquids which were aerosolised in order to be dispersed. This use was not as effective on the battlefield as designed or imagined; and particular not effective in gaining victories through casualty or fatality count, as both agents, even when atomised and dispersed as a large cloud, caused symptoms which typically resolved themselves after thirty minutes, even with the less-than-rudimentary understandings about masks, ventilators, or personal protective equipment. The effects of Xylyl bromide and ethyl bromoacetate were that, as lacrymatory agents, they caused tearing, affected subjects breathing by causing shortness of breath and exacerbating pulmonary illnesses or diseases, and in some cases leading to temporary blindness; but rarely chronic or critical conditions. The short-term strategic advantage that was sought was obvious though - where troops fell

victim to xylyl bromide they were scattered, rendered incumbent by the pain and discomfort, and unlikely to be able to counter-attack with any strength or organisation. For a demonstrable proof of concept it enjoyed limited success, with a series of conditional dependencies (Marrs *et. al*., 2007).

In January 1915, the German army used Xylyl bromide against Russian troops - firing approximately 18,000 shells containing the lacrymatory agent in a battle at Bolinow. The attempt was not a success, as the liquid Xylyl bromide did not vaporise as planned when attempts were made to detonate the devices due to the extreme cold. There are parallels that reverberate even to the present day regarding the efficiency of tear gas in cold climates. It is not the riot agent of choice in Mediterranean, temperate and desert climates for no reason - areas where the climate influences high humidity and temperature are the perfect conditions for tear gas to display a staggering potency, using sweat and open mucous membranes to target the lacrimatory and pulmonary systems. Over the next 100 years, there would be corroborating evidence that atmospheric pressure, temperature, and climate conditions influenced the 'success 'or relative toxicity of tear gas deployments.

From Neuve Chappelle to the banks of the Rawka river, tear gases were used in conjunction with other, more poisonous gases, in a tactic that exploited the physiological response to a lacrimatory agent by staging the deployment of chlorine, phosgene or mustard until after an enemy force had been subjected to tear gas and most likely removed their personal protective equipment - rudimentary face masks or ventilators - to claw at relief for their itching and burning eyes, nose and throats. "An infantry assault on the British First Army at Vermelles on 27 April 1916 was preceded by lachrymatory gas shells and clouds of harmless smoke. Before the second attack, an hour later, lethal chlorine was released, designed to surprise soldiers who had removed their respirators" (Jones, 2014:358). With the application of military tactics seeking to exploit the enemy's temporary incapacitation, tear gases had a place in warfare, especially that which took place in closer quarters and confined conditions. Tear gas had the potential to punch a hole in trench-based defences and to act as a valve by which the lineated structure of the front could be explicated and exploited. Tear gas held over battlefields, at once at the mercy of the environment and harnessing its potency, causing early gas casualties to suffer severely and even to be withdrawn from the front after more frequent exposure as the lacrimatory effects became

compounded with frequent use. Significantly, whilst casualty lists do not stray into the identification of the specific compounds at play causing death or serious injury, the utilisation of tear gas often preceded a more deadly poison gas strike and would have been an exacerbating factor to mortality. Tear gases or other irritants were often deployed prior to the release of phosgene or chlorine, as the lacrimatory and irritating factors could bypass masks and frustrate soldiers into removing what little respiratory protection they had (Spiers, 1999).

Tear gas was a feature of both Allied and Axis powers in World War I before more comprehensibly fatal gases such as chlorine, phosgene, and mustard were invented and militarised, and deployed first by French units in August 1914. Due to their non-fatal outcome, and in some cases the marginality of the impact tear gases (particularly the bromine-dependent gases of early French efforts) there was a collective mentality that tear gases did not breach the Hague Treaty of 1899, which forbade asphyxiating or deleterious poisonous gases (Windsor, 1965) (Jacobs and Kovac, 2020). Tear gas use acted in many ways as an opportunity to explore and understand the potential power of gas warfare, informing and shaping gas weaponry development as much as the potential requirements for defences.

2.3 Tear gas in the interwar period - lobbying, law and order

There had been historical attempts to control and regulate the use of chemical and biological weaponry before parties gathered in the advance of World War I. The legal characterisation of gas use in warfare begin in earnest with the Hague Convention of 1899. The Hague Conventions were the first two multilateral treaties on the practice and conduct of warfare, themselves based on the Lieber Code of 1863, a codified law which set out regulations for the following: “behavior in times of martial law; protection of civilians and civilian property and punishment of transgression; deserters, prisoners of war, hostages, and pillaging; partisans; spies; truces and prisoner exchange; parole of former rebel troops; the conditions of any armistice, and respect for human life; assassination and murder of soldiers or citizens in hostile territory; and the status of individuals engaged in a state of civil war against the government” (*Lieber Code, 1898*).

Tear gas does not just produce tears. A lacrimatory agent, having its greatest effects on the fluid, viscous membranes - particularly the eyes and throat, tear gas can

also produce effects such as blindness or the loss of eyes (Quiroga-Garza *et al.*, 2023), excessive mucus production, coughing (Bismuth *et. al*., 2004), nausea and vomiting (Karalliedde *et. al.,* 2000), blepharospasm (Blain, 2003), burns (Zekri *et. al*., 1995); and in stronger concentrations or the CN form, tear gas has been linked to cases of respiratory arrest and asphyxiation (Kiel, 1997:759). This all conspires to challenge understandings of its designation as 'non-lethal' whilst subverting the best intentions of the term 'less-lethal'. In warfare, tear gas has proven an effective tactic as a siege-breaker, tool of area / aerial denial, but this section of the literature review will primarily deal with tear gas as used by policing agencies and other forms of state governance, not military personnel or units. Questions still swirl about whether tear gas is "an appropriate law enforcement tool" (Horowitz, 2020:61) especially when utilised on people who are not part of a 'riotous' assembly.

2.3.1 Conventions and prohibitions

The potential use of gas weapons was intimated as far prior to WWI as the 1860s, with the 1868 Declaration of St Petersburg noting that concerning large projectiles or those "charged with fulminating or inflammable substances", "the employment of [such] arms which uselessly aggravate the sufferings of disabled men, or render their death inevitable" would "be contrary to the laws of humanity" (*St Petersburg Declaration, 1868).* Centuries earlier, in 1675, France and the Holy Roman Empire signed the Strasbourg Agreement, prohibiting the use of poison bullets. This held effect throughout a period of advancement, conquest, and re-bordering throughout most of Western Europe. Whilst the Brussels Declaration of 1874 was never formally ratified by the parties that agreed it, it helped bring about the Hague Convention by setting forth an expectation that 'poison or poison weapons' should be banned.

Drawing heavily on the Lieber Code as well as fears about strategic advancements and militaristic applications of such technologies as mass production, the Hague Convention of 1899 consisted of three treaties and three declarations, of which the 'Declaration concerning the Prohibition of the Use of Projectiles with the sole object to Spread Asphyxiating Poisonous Gases' (*Hague Convention II, 1899*) is most pertinent to our examination of the legal grounds for tear gas use.

There were actually two pre-World War I Hague Conventions - the Declaration of the Hague Convention of 1899, and its successor, the Hague Convention of 1907.

The rapidly developing chemical industries of over 30 countries were brought together under the signature of compliance that they would "agree to abstain from the use of projectiles the object of which is the diffusion of asphyxiating or deleterious gases" (*Hague Convention II, 1899*). Signatory powers acknowledged that "the use of projectiles the object of which is the diffusion of asphyxiating or deleterious gases" (*Hague Convention II, 1899*) were prohibited and in doing so, made the first formal modern declaration on the terms of war. Later amendments in 1907 prohibited signatories from "employ[ing] arms, projectiles, or material calculated to cause unnecessary suffering" or from "kill[ing] and wound[ing] treacherously" (*Hague Convention IV, 1907*).

The Hague Conventions attempted to bring order to a rapidly developing industry and its militarised associations. Whilst specific chemical compounds were not articulated in the text of the regulations, 'poisonous or deleterious gases' most certainly applied to tear gases amongst their close relatives - the nerve and poison gases, were used frequently in the early battles of WWI. This declaration was ratified by all major powers, except the United States, which provides the background for a critical understanding of the work done by Chemical Warfare Service (CWS) and research and development divisions of the US Army in wartime, and their legacy for tear gas use in peacetime by police forces.

2.3.2. The Chemical Warfare Service

In our exploration of the violent backgrounds of tear gas use we travel from Ypres to Edgewood Arsenal in Maryland, the wartime home of the US Chemical Warfare Service, (CWS) itself born of the Bureau of Mines and the Gas Service Section. Late in WWI, the CWS incorporated the disparate Gas Service and Chemical Service sections, owned by Major General William L. Sibert. Sibert had been in Europe leading the 1st Infantry Division during its training, but was relieved by General John J. Pershing before the Division headed to the front line - a relief for the breveted Major General who, at 58 years old had (in the words of Pershing) "neither the experience, the energy, nor the aggressive spirit … to handle them under battle conditions" (Pershing, 1931:189). Away from the front line however, he gained a new lease of life.

Upon his removal from the 1st Infantry, Pershing recommended Sibert to head up the War Department's new creation, the Chemical Warfare Service, which he commenced on June 28, 1918. His impact was limited to the research & development and production of chemical weapons in the US however, as in Europe, under the control of the American Expeditionary Force, Colonel Amos Fries managed the CWS and their arm of gas-trained squadrons, who were a sight to behold with their gas protective equipment and additional training.

It was Fries who succeeded Sibert when in 1920, he retired with the eternal moniker of 'Father of the US Army Chemical Corps' (Faith, 2014). Sibert may have been the first commander, but Fries set to work, was ten years younger and driven by the fervency of his anti-communist agenda, and immediately upped the ante of what the CWS sought to achieve in the Interwar years. Peace, after all, was bad for business. Reactionary art, poetry, prose and politics drew upon the barbarity and godlessness of gas use in WW1 and anti-gas sentiments spread thick and fast in the civilian population, freed from jingoistic propaganda and exposed to a new, biting reality of caring for long-term gas casualties. "The U.S. Army Surgeon General reported that the AEF (American Expeditionary Force) sustained more than seventy thousand poisoned gas casualties in the war - nearly 30% of the total U.S. casualties in the war and a higher percentage of chemical warfare casualties than any other nation's army" (Faith, 2014:57) which began impacting across sectors of society such as healthcare, education and prisons. Faced with the sobering realisation that America had been weakened by its intervention in the European theatre, it became clear that financial support to continue the mission of the CWS would be difficult to access. "The future of the Chemical Warfare Service (CWS) and chemical weapons was uncertain in the postwar world" (Faith, 2014:56) so it had to be designed around what would suit their needs and the appetite for increasing budgets which had grown exponentially in the latter stages of WWI.

Fries was a lobbyist by trade. He "created a network of informed supporters through his correspondence … [educating] them about chemical warfare … and urged them to contact members of the House and the Senate in support of the CWS". (Faith, 2014:63), seeing the opportunity to maintain the funding streams and research & development portfolio which he had taken on from Sibert. His militancy and organisation, his single-mindedness and influence were attributes which had served

him well in building the CWS in Europe during WWI even in the face of far superior efforts from the German Army, aided as they were with Dr Fritz Haber. Fries created propaganda material, linking the hesitancy around gas use to Communist sentiments, and equating those concerned with the prevalence of gas weaponry to carrying out acts of domestic subversion. He accused the National Council for Prevention of War (NCPW), the peace-building organisation headed by Quaker Frederick J. Libby, of being a Communist 'front' when it critiqued the rapid development of gas warfare technologies. It was a strongly emotive association which saw even large organisations like the National Congress of Parent Teacher Associations removing their support from the NCPW in a foreboding precursor of McCarthyism, all seeded by the actions of Fries as an expert manipulator of the gas warfare tides.

This propaganda included a lecture to military officers at the General Staff College in 1921, where Fries was effuse in his praise for the [CWS] organisation and its achievements in WWI, stating that the United States had been on the back foot - entering the hegemony of chemical warfare "with no precedents, no materials, no literature and no personnel." (Fries, 1921) but exited WWI with a robust and capable structure, flexible to mobilisation and above all - malleable strategic intentions. With no war immediately on the horizon, indeed - with splintered Western European countries needing to lick their wounds and count their (quickly increasing) deficits in trade, manpower and capabilities, Fries knew that he would have to leverage new markets. The natural pivot was for weapons of war to be rebadged as tools of law and order - with the proviso inherent that civilians would not be able to purchase tear gases and level the playing field, as the compounds and materials they would strictly be governed by policing agencies, thus enrolling the CWS in a new relationship that would outlast its tenure as part of the US Army.

Fries saw the potential for tear gases - amongst other war gases - to be the dominant technology emerging from WWI. Whilst the arrival of modernity had brought control of the underwater (submarines) and air (zeppelins), control of the environment was the ultimate intersection of scientific and military power (Preston, 2015) and with the right business plan, this domination would have just as strategic a place in the home front. Keeping the current leadership in power, in the face of rising worker's rights and civil rights campaigns, was the ulterior motive; Fries was "firmly convinced that as soon as officers of the law and colonial administrators have

familiarized themselves with gas as a means of maintaining order and power there will be such a diminution of violent social disorders and savage uprising as to amount to their disappearance" (Knappen, 1921 quoted in Feigenbaum, 2017:21). It was this perception of 'social disorders and uprisings' which led to the pivot into marketing war gases to policing; imbibed with the view that as cities developed and became more racially diverse, there would be a breakdown in norms of law and order, thus necessitating new approaches to controlling citizens.

A heavily racialised marketing emerged in the marketing of tear gas in the Interwar period. Large-scale testing was arranged for New York and Philadelphia Police Departments, cities with a significant Black population. Upon seeing the results, the Director of Public Safety for Norfolk, Virginia remarked "in this city, where it is possible that we may have a great deal of trouble with the negro element, such a device, I believe, would work to perfection" (Jones, 1978:161). Perfection, in this case, is utilising tear gas to suppress any potential for civil rights movements to gain traction. With the use of tear gas, the capacity for protestors to organise against his occupying police forces, or for mobs to prevail would be limited. Fries spoke high praise to every official he encountered for tear gases, noting they "appear to be admirably suited to the purpose of isolating the individual from the mob spirit…he is thrown into a condition in which he can think of nothing but relieving his own distress" (Knappen, 1921 quoted in Feigenbaum, 2017:28).

The Chemical Warfare Service lobby for the use of some war gases, including tear gas, during 'peacetime' as well, was emblematic of how [the scientists] "were not willing to see the dissolution of the CWS without a protest" (Ede, 2002:128) by extolling the virtues of how early tear gases could be utilised in a domestic riot control scenario. This lobbying went hand in hand with the PR campaign activated by Fries, who published a journal on his subject to raise awareness and literacy amongst the scientific community, appeared at conferences, and lobbied decision-makers in the later treaties which were concerned with the potential banning of all gas or chemical weapons. It was successful. Successive US Presidents refused to sign and ratify the treaties of the Chemical Weapons Convention, pushing the issue back in time as far as the Vietnam War. The U.S. Department of Defense heavily advocated for tear gas as a riot-control agent as part of a formal exception to the Geneva Protocol, which drew criticism from some Senators when Nixon prevaricated on the issue of tear gas being

subject to international regulation owing to the perceived need for its use in Vietnam (Winzoski, 2007:68) “The fact that [tear gases] were made available to police forces rather than remaining in the hands of the army meant that tear gas could be used on civilians in the cities of the US” (Jones, 1978:151).

Yet there was a paradox emerging, with the contention that tear gas use in war should be reconsidered as permissable, as it reduced the risk of lethal chemical warfare agents being utilised. Again, the debate raged on regarding tactics of tear gas deployment in theatre, with some claiming that it was being employed as a siege-breaker, to flush combatants out into open spaces where they were vulnerable to conventional weapons including mortar and machine-gun fire, with others claiming it lead to strategic territorial advances being made with less casualties (largely because the Americans were taking so many Viet Cong as Prisoners of War). In ‘Better to cry than die, Eardly assets that “tear gas’s greatest paradox … [is] that American police forces face few regulations on its use, and citizens can purchase military grade supplies over the internet, yet international protocols [now] forbid the use of tear gas as a weapon of war, despite its proven ability to limit deaths” (Eardly-Pryor, 2012:50). Eventually, a ‘national policy’, which carried far less significance than a formal interpretation of the Geneva Protocol, was issued determining that tear gas was not covered by the Protocol (Shapley, 1975:149), leading to the status of tear gas, as a weapon banned in warfare but permissible to utilise upon civilians, becoming a controversial ethical dichotomy which persists to the current day.

To offer some clarification in summary regarding this legally fraught weapon and the history of its legal governance, tear gas - in its weaponised form - is illegal for use in warfare, yet an acceptable tactic for police use as a riot control agent. (Moss, 2020). This is despite or in spite of the best efforts of the US CWS to find and exploit loopholes in international legislation, including the Chemical Weapons Convention of 1993 where tear gas is treated as a RCA and “Article I 6) prohibits using RCA ‘as a method of warfare’ but does not define the term method of warfare, leading to a potential exception” (Montazzoli, 2021). I will discuss more on this “exceptional” weapon in a later section taking inspiration from Agamben’s (2005) work on the state of exception. Further, attempts by the US to introduce a formal ‘reservation’ to the CWC for the purposes of prolonging tear gas use in Vietnam have been voided, as the CWC does not make exemption for reservations.

2.4 Biopolitics, thanatopolitics, and tear gas politics

This next section of the literature review takes us away from establishing the historical context of tear gas use and legality, and into schools of geographic thought which enrol violent geographies. The concept has been examined over a number of years, largely incorporating the poststructuralist turn, postmodern geographic research and the rise of critical, feminist, political geography approaches which examine power and violence. There is also a space within this literature for historical geographies, although there is a concerted effort to not stray too much into historiography when exploring the events which have generated some of the most significant thought on violence and politics as entwined with tear gas today.

Literature concerning geographic concepts of biopower and biopolitics provides an important way to read and understand how tear gas is utilised today. This section aims to explore how biopolitics, that all-encompassing, totalising term, (Hardt and Negri, 2009) applies to tear gas use across the globe and takes in concepts of sovereignty, biopower and violence. Through this section tear gas is positioned as a significant subject and actor within biopolitical literature, examining the impact of Foucauldian readings on the topic with key authors who have explored biopower amongst other mechanisms of exerting state control and understand how tear gas contributes to this. It can be asserted, almost as a foregone conclusion, that tear gas is a uniquely biopolitical weapon, drawing its origins from the 'air-quake' of Sloterdijk (2009) and atmospheric explication, before being shaped as an essential regime of state control over the physical being of a person: being in a body, and being in the air.

2.4.1 Biopower and tear gas - Foucault

Biopower was conceptually introduced by Foucault in 1978, writing six pages on the themes of sovereign power - arguing that the sovereign had the power to decide life and death. This became known as judicial sovereign power. It was adapted by Agamben and Negri, and in turn by a swathe of poststructuralist and postmodern geographers, engaging with the "contexts, conditions of possibility, *a prioris* and *aporias* of phenomena such as truth and error, presence and absence, subjectivity and objectivity, testimony and fiction, representation and the sublime, correspondence and communication" (Harrison, 2014: 138). Biopolitics is "a form of power that regulates

social life from its interior" (Hardt and Negri, 2000:23).

From concepts of governmentality (Foucault, 2002) to the regulation of social life (Hardt & Negri, 2009), we can also understand biopower as playing out through the movement from 'societies of discipline to societies of control' (Deleuze, 1995) which rings true for our understanding of how tear gas can be utilised by policing forces in order to act as a mechanism of suppressing dissent and repressing movement. As an inherently biopolitical tool (or weapon), tear gas acts as a 'technology of power', the deployment of which organises (sorts and hierarchises) human subjects as a population and suppresses or economises the truth, or regimes of truth, without which there would be no power (Foucault, 1980:133). Ultimately, through our early examination of what the conditions of tear gas deployments are, we can assert that there is a form of biopower at play, though not necessarily the sovereign power discussed as "the relation between the sovereign and the life of his subjects is a dissymmetrical one of permissiveness and seizure" (Cisney and Morar, 2015:2) but a more disciplinary mechanism.

The techniques of biopower function to "incite, reinforce, control, monitor, optimize and organise" (Foucault, 1978:136). It is a power that is 'taking charge of life' (Foucault, 1978:143) (Lilja and Vinthagen, 2014:110). That power is mobilised as the "specific strategies and contestations over problematizations of collective human vitality, morbidity and mortality, over the forms of knowledge, regimes of authority, and practices of intervention that are desirable, legitimate and efficacious" (Rabinow and Rose, 2003:3). This connects to the concept of modernity dawning through three violent scientific revelations that I will discuss in the next section, where disciplinary power arises from the "multiplication and expansion of the human sciences which are made to serve as the legitimating discourses of this new form of power" (Cisney and Morar, 2015:4) and its associated forms of governance.

2.4.2 Biopolitics and tear gas - Agamben

Another key writer on the theme of bio power is Giorgio Agamben. There are three key concepts which contribute to our understanding of tear gas as an object or being of biopower, which I will outline: Homo Sacer, the state of exception, and bare life. To start with, we return to Foucault's sovereign power. For Agamben, sovereign power was already political, being that it is based on the threshold from which one is

either inside or outside of the political order (Donaghue, 2015). Writing on biopower, Giorgio Agamben constructed "the holocaust [as] the ultimate exemplar of biopower (Rabinow and Rose, 2006:200) enrolling what he termed the 'state of exception' (Agamben, 1995; 1996) where Homo Sacer is reduced from *bios* (proper life) to *zoe* (bare life).

To further contextualise: Agamben posited that "since the Greeks, Western political order has been built through the separation of natural life (*zoe*) and socio-political life (*bios*)" (Christiaens, 2022:38). Homo Sacer was his term for the individual who "transgresses the basic laws governing community membership… Legal protections are thenceforth suspended." (Christiaens, 2022:38). From this point, "the sovereign has complete authority over Homo Sacer, not only as a citizen of a state, but even to the point of acting upon his/her own natural life, depriving this individual of the right to live" (Giordanengo, 2016:2). In this space, which is referred to as a State of Exception, being as it is "given a permanent spatial arrangement (Agamben, 1998:196), the normal order of things is suspended, and within which its inhabitants are stripped of their political status (*bios*) and become bare life (*zoe*). Biopower begins at "the point at which the biological life of subjects enters politics and belongs entirely to the State" (Rabinow and Rose, 2006:200). There is a burgeoning theme of research which aims to situate atmospheric law between bios and Zoe, aligning the Exception to understandings of air power. "Gas is in Agambian (2015) phraseology the 'practice of exception' because it so brilliantly incorporates what is a natural practise, i.e. breathing, into a bio-political killing machine. Its necessity is used against the breather while the air itself transforms from a condition for animation into a threat to 'de-animate', therefore, becoming also a technology of what Mbembé (2003) terms 'necropolitics'" (Nieuwenhuis, 2018:6). However, before running away into a conceptualisation of atmospheres within law, life and living, I spent some time thinking of the place of tear gas within debates about the exception.

For Agamben, "the Holocaust is the ultimate exemplar of biopower" (Rabinow and Rose, 2006:200) and the camp is distinctly the product of sovereign power (Agamben, 2000). He approached the consideration of the camp "not on the basis of the events that took place there, but rather by asking "what is its legal and political structures such that such events could have happened there?" (Weber, 2012:7). Whilst in no way as extraordinary as the existence and then subsequent attempts to make sense

of the camp, I was intrigued as to whether the Agambian concepts of biopower could apply to tear gas and allow for sense-making regarding how it functions as a what I have established as a disciplinary tool. I think there is nuance and would never make a direct parallel between tear gas and the camp as a space of exception, however find the concept interesting for all that it enrols about how the state sources and legitimises power based on the ability to suspend the normal, just, political lives of its citizens: "all power rests ultimately on the ability of one to take the life of another—it is a power over life grounded in the possibility of enforcing death" (Rabinow and Rose: 2006:200).

The relation between gas (air) and the human body is also one subject to discipline - through the removable of freedom to breath, or introduction of a gas designed to harm or kill, the power dynamics of who is afforded breath and who can be made to die are played out through biopolitical logics. As Nieuwenhuis explains in his excellent work on atmospheric governance: "this meant that gassing could be used extensively to discipline the body of the 'non-human'. The taking away of the right to life, by making breathing literally impossible, was legitimised in the injunction of the distinction between the civilised life of the human Self and the bestial Other" (2018:12). This is reinforced by Theophanidis who considers tear gas to be a "biopolitical *par excellence* as it does not unfold its violence on the bodies without the latter's consent" (Theophanidis, 2013) and how "non-lethal-weapons, a more-than-technical term, are used extensively to discipline the biological body into political order" (Nieuwenhuis, 2018:1)

The concept of biopower is not without critique, and for others, there is an opportunity to unsettle and counteract established ideas regarding biopower and biopolitics, particularly regarding themes such as citizenship, status, health and governing. Moving away from Agambian notions that concerned the Holocaust as the ultimate expression of biopower and biopolitics, new interpretations attempt to re- enter the subject. "We develop 'biopolitics multiple 'as a methodological device to attend to how biopolitical technologies are deployed in practice, how they are enacted differently from site to site, while still somehow 'hanging together'… [and] propose to unsettle binary oppositions such as inclusion/exclusion, biopolitics/necropolitics, affirmative biopolitics/negative biopolitics, making live/letting die that have undergirded much work on biopolitical technologies of governing" (Aradau and Tazzioli, 2020:201).

Tear gas, as is shown, is a uniquely powerful biopolitical agent, particularly one which has the capacity to make and remake the political order.

2.4.3 Thanatopolitics and tear gas - Nieuwenhuis

Building on evolving understandings of biopower, theorists have asserted that "exceptional paroxysmal forms of biopower, linked to the formation of absolutist dictatorship and mobilization of technical resources, can lead and have led to a murderous thanatopolitics" (Rabinow and Rose, 2003:1). For contemporary states, "biopower is a gardening and cultivating form of power; one that uses surveillance, but is able to only react when some behaviour gets out of hand" (Lilja and Vinthagen, 2014:119). But who determines when that behaviour is out of hand, when the line has been crossed, and at what level the intervention is justified? The obvious counterpoint which arises from our discussion of biopolitics is what is the opposing force or process? What contests the powers that "make live" a population through the use of less-lethal weapons on them as a condition of discipline and punishment, but not the ultimate removal of their political rights and political life? A number of concepts speak to the counterpoint but thanatopolitics, as constructed by Murray is key here: "thanatopolitics would expose the fault-lines of biopolitical logics. It would attend to the rhetorical conditions in which the dead, the dying, and the dispossessed might rise up and speak" (Murray, 2018:719). The dying and the dispossessed, for me in the context of this exploration of the literature, are those subject to tear gassing - the manipulation of their atmospheric conditions and the near-to-death experience that is a realistic possibility with each exposure to tear gas gives them the haunting characteristic of citizens on the verge of being 'un-alived'.

"Foucault marks the important shift from classical biopower to modern biopolitics. Classical biopower is summed up as the sovereign decision ''to take life or let live,'' whereas modern biopolitics is conceived as ''the power to 'make' live and 'let' die.'' The decision to kill or let live is replaced with a productive biopolitics that is twofold, that ''makes live'' and ''lets die.'' Death becomes a consequence, a necessary part of living." (Murray, 2018:204). In the same vein, non-lethal weapons like tear gas become part of the power and "force[s] law into a direct engagement with the conditions that facilitate the division between animation (life) and de-animation (death). This is to say that non-lethality always carries within itself the difference of death" (Nieuwenhuis, 2018:25). The concept of non-lethality, in other words, is

haunted by thanatopolitics, necropolitics, and the ghosts of what sovereign power could have exercised over life.

There is still much to consider in this space with regards to how tear gas and thanatopolitics are related. The question persists of where to draw the distinction between life and death, particularly in relation to being made to breathe incapacitating agents and therefore be complicit in the body trying to continue the configurations of its essential criteria for life, whilst compromising those essential characteristics of health. The literature is bereft of a debate regarding "the extent in which NLWs constitute an abandonment of biopolitics and the start of thanatopolitics. Although these weapons are legally defined by their non-lethality, they simulate the experience of dying, forcing the body into a physiological and psychological shock" (Nieuwenhuis, 2016:514).

In conclusion, the (re)definition of biopower which is brought out through discussion of the contemporary states of relations between 'letting die' and 'making live' brings us to consider how tear gas relates to the atmospheric laws we require to live, as explained by Rabinow and Rose and Mbembé respectively. First, biopower is clarified as requiring three core aspects: "one or more truth discourses about the 'vital' character of living human beings … strategies for intervention upon collective existence in the name of life and health … modes of subjectification" (Rabinow and Rose, 2006:196). This first vital characteristic is our dependency on air for life: "it is the hold that law has over the conditions to animate the body that makes the practice of gassing and the absolute quality of air so pivotal" (Nieuwenhuis, 2018:81) and then secondly how those laws do not revolve around the protection of life, but the "subjugation of life to the power of death that reconfigures the relations among resistance, sacrifice and terror" (Mbembé, 2003:39).

2.4.4 Tear gas and the 'other'

Examining the use of tear gas at the border between two countries or states draws together critical perspectives on territoriality and sovereignty, and how state power is exacted through the mastery of atmospheric control. Tear gas use on refugees has been a common sight in news broadcasts since the 'refugee crisis' of Europe in 2014 (Hope, 2020) (Roth, 2022). Queues of people attempting to move between countries were often subject to tear gas barrages in an attempt to repel their bodies

from the space of the country targeting them, or to enact an order to situations which often defy logics of counting and sorting, and can become viewed as the space where the 'exception' is constructed (Davitti, 2018). Where tear gas is used by a police force on its own citizens, there is a legal basis for this - a police force has been vested with the power to use certain objects which are not in the public domain, and they do this according to assessments of risk and situational awareness. This is permissible in law, as no entity has breached guidelines on utilising chemical weapons as an aggressive act against citizens of another nation, and indeed, the use of tear gas may be proportionate to the protest or gathering. However, when tear gas is used on persons who do not belong to the state, that is to say, they are not citizens or residents of that state, and subject to a legitimate enaction of its power, there are complex and testing arguments to suggest that this is not only unlawful but tantamount to chemical warfare. When Weber states that "one of the defining characteristics of the modern state is its claim to maintain a monopoly on legitimate violence in the country it governs" (1978:54), there are direct parallels between the refugee body which is already subject to intense political, social, economic and biological scrutiny (including age testing, which has no bearing in medical authority) and now an additional level of precarity through repeated tear gas exposure, enrolling thoughts of the refugee at a border being representative of Homo Sacer; subject of nothing, vulnerable to everything.

Feminist geographers have incorporated tear gas into their writing of biopower, protest and precarity. Some take a perspective that there is a politically-induced condition where certain groups of people become unfairly, overly, or differentially exposed to violence, thus rendering them precarious, or 'othered' (Bauman, 2013) by acts that "dehumanise them to the extent that containment and neglect of human rights are considered acceptable" (Plant, 2022:15). Cachelin argues that protestors affiliated to the Black Lives Matter (BLM) movement are othered and that "colonial logics, power structures, and hierarchies inform the deployment of tear gas on BLM protesters today" (2023:513). Athanasiou draws on Agambian notions of bare life to explain her concept of precarity where female, migrant bodies are treated as disposable. "The protests went on in a thick, toxic cloud of tear gas and other carcinogenic chemical substances. Every time the suffocating tear gas swept over the square, the crowd retreated slowly, waiting for the gas to blow away." (Athanasiou, 2014:2) She also talks about the moments of solidarity, where protestors are actively engaged in pro-social behaviours to help each other counteract the effect of tear gas use. The crowd

behaves as one, not in a riotous assembly where all connection to one's fellow is lost, but as an organism, engaged in co-operative support, all whilst still protesting. "Wearing surgical masks, scarves, goggles, and, occasionally, gas masks to endure the tear gas and applying soda pop to each other's faces to mitigate the effects of the chemical cloud, protesters defended public space as a site of agonistic coexistence against regimes of disposability - not only their own but everyone's (Kambouri and Hatzopoulos, 2011) (Athanasiou, 2014:2) Counteraction of tear gas was developed and widely utilised in Hong Kong, after the Umbrella Revolution. Protestors now have organised their procurement of masks, and rarely show their faces, though are supportive to each other, identified as a collective through the consistent manner of their dress. "Through the mask, the living subject confronted the state's biopower through an imminence of risking, living and expressing. In the meantime, with the mask worn by both the protestors and the police, violence also escalated, so that mutual condemnations become endless." (Pang, 2021:630)

Tear gas can be constructed as an inherently, indisputably biopolitical means of exercising control over a population, a weapon that aids in 'societies of discipline' and 'societies of control' (Deleuze, 1995). In these societies, for Lentin, protesters, who regularly stand "at the point of indistinction between violence and the law" (Lentin, 2011:43) are Homo Sacer, "the ideal-type of the excluded being, whose life is devoid of value; therefore killing ... is not a punishable offence" (Lentin, 2011:43). Being as killing them is not punishable, exerting other harms is also permissible, including depriving persons of their ability to breathe clearly, assemble closely and communicate clearly. Tear gas "clogs the air, the one communication channel that even the most powerless can use to voice their grievances" (Feigenbaum, 2014) and therefore subjects those experiencing tear gas use to a hopelessness and helplessness.

Tear gas deployments are realisation of "sovereign power [which] stops and limits certain behaviour. Often this form of power involves a dramatic show of force, the use of examples, violent punishment and even extreme pain" (Lilja and Vinthagen, 2014:112). Tear gas prevents and abbreviates the protest continuing, by removing the conditions for it to be safely undertaken. The deployment is an act of violence against the helpless, those who may already be vulnerable, and those who are made helpless by being removed of the ability to communicate. Though, to many, tear gas is the "least of all possible evils" (Weizman, 2012) as it is far preferable to endure with

countermeasures than the damage caused by rubber bullets or other such percussion devices. The tolerability of tear gas use hinges on its correct deployment however, and evidence from across the globe presents that in many cases, the guidance and doctrine regarding tear gas release is willfully ignored in the face of intolerability (Sollum, 2012) (Chan *et al.,* 2019).

This links back to Levick's (2014) assertion that tear gas is 'ostensibly' a non-lethal product, not a weapon, however this can, and must be refuted. Similar sentiments are expressed by Rappert (2003) arguing that first, there is no evidence to suggest 'non-lethal' is a guarantee of non-lethality, and second that the popularising of the use of non-lethal weapons is an act of subjugation of a citizenry believed to not be worthy of state protection. When he (Levick) characterises tear gas as outside of the debate over the militarisation of the police, he neglects an entire wealth of literature that places tear gas firmly within militarisation; from its early invention to modern day use and presence on the belts of police officers across the globe. Tear gas, however, also has the ability to unite a human population, and resist forms of biopolitical control. Where tear gas is deployed, it unites sufferers. Through the practices of solidarity tear gas use can be resisted, as advice is shared and publicised which empowers those who experience it to be able to manage their reaction, limiting the severity of its effects.

When it is deployed in order to disperse crowds – deemed to be riotous assemblies, though this declaration in itself can be critiqued as "an assembly is riotous when the authorities say it is" (Dhorchaigh and Cox, 2009:244) according to Habermas's principle of performative utterance – tear gas is effective; it immediately forces the evacuation of bodies from that space. However, this can be contested – if the protesters have acquired or improvised gas masks, or in some cases are able to struggle through the sensations, which was demonstrated in the 2014 Hong Kong protest ethnography. This ties together ideas of security and governmentality in the performance of the protesters - if they immediately disperse or stand down from their position, could this concession be interpreted as a victory, and therefore justification of the use of tear gas in limiting casualties brought about by protest action, movement, and direction? Unfortunately, this lofty aim is rarely achieved, with significant evidence that the deployment of tear gas causes relatively little change to protest structures and behaviour outside of the immediate reactions and movements of those overwhelmed, however temporarily.

2.4.5 Precarity and security

Being caught in a gas cloud is an immensely precarious position, where the body collaborates with its own demise (Sloterdijk, 2009). Tear gas use exemplifies the ideals of a regime of governing that concerns itself with the control of a biological population, rather than bodies in the singular. Atmospheric warfare and environmental biopolitics intersect and aid understanding of the potency of tear gas as an extension of sovereign power, and how implicit control of the atmosphere and environment is in the political management of life, and death. Control is enacted because the use of tear gas in a given location simply and effectively causes the bodies within that space to need to leave it. The position of power that is occupied by bodies during a protest, closely packed together, taking over streets or squares or places of importance, is affected, and a physical occupation is prevented as the environment it would take place in becomes inhospitable. "To secure one group, ensuring their welfare and vigour, another group must be made more vulnerable, their lives exposed to the conditions of bare life – especially in the urban context" (Penny, 2010:5). Tear gas, while non-lethal, threatens the body's ability to make life, to breathe safely and uninhibited, and therefore is a biopolitical weapon, whilst also in cases pitting bodies against each other. Considered through the performance of vulnerability in proximity – Butler outlines various moments of "up againstness" (2021:134) where there may be tensions between the bodies simultaneously enrolled in the same experience but affected and marginalised in radically different ways and scales. "Corporeal fragility both equalizes and differentiates: all bodies are menaced by suffering, injury and death (precariousness) but some bodies are more protected and others more exposed (precarity)." (Watson, 2012) At the heart of some of the most disparate vicarious experiences of tear gas use were the natures of vulnerability and intersectionality of its audience – some refuting that the experience had any effect where others were subsumed and overwhelmed, particular shown in later modern accounts of its use. Where biopower concerns the control of human beings as a species, tear gas goes further, and controls the environment itself, and this can play out in the embodied experience of tear gas use on the human body in a variety of means.

How does tear gas contribute to security? How does tear gas act to enhance, maintain, or bring about security? By dispersing protestors from an area, tear gas returns the space to the control of the police or state. Tear gas also prevents

communication between protestors and thus removes the mechanisms of protest from the space in which it would take place (Feigenbaum, 2017). Physiologically, its use suppresses the voices of protest, acting on the nose and the mouth in order to literally 'quiet' a crowd by forcing them to close those orifices and focus on the fundamentals of existing - breathing clearly and deeply again. However, even when combined with strategies of media censorship and social network suppression such as in Hong Kong, it was clear that the protest narrative could not be dispersed. What tear gas deployments in the 21st Century could not suppress though, is the rapid spread of details of the victims through social media.

Tear gas also perpetrates a narrative of escalation; it is a non-lethal product, but is commonly used in conjunction with water cannons, rubber bullets, baton charges and other 'less-lethal' but strategic and violent methods of crowd control. It was therefore important to examine the circumstances surrounding the whole protest, rather than the single deployment of tear gas, in order to see what other tactics were at work, to conclude about the effectiveness of tear gas as a means of securing an area, a volume, and a group of people.

2.5 Airquakes, atmoterrorism and atmospheres

This section of the literature review will concern itself with reading through works regarding air and atmospheres. Air is not just the substance which sustains us physically, but "the stuff of poetry, painting, literature, and scientific inquiry; air gives sustenance to our imagination (Adey, 2014:9). Those works of poetry or painting have their own atmospheres too, as in the engraving of An Experiment on a Bird in the Air Pump (Wright, 1769) Adey asserts "we can almost see a tangible atmosphere' (2014:20). "Perhaps there is nothing that doesn't have an atmosphere or could be described as atmospheric" posits Anderson (2009:78). Through the exploration of works that consider air and work on lively, embodied volumetric geographies, this section of the literature review will consider what it means for tear gas to affect the atmosphere and what can be learnt about our relationship with the cloud of a tear gas deployment, during and after it dissipates. "Atmospheres are the shared ground from which subjective states and their attendant feelings and emotions emerge" (Anderson, 2009:78) and for this thesis, in connection with tear gas use, the atmosphere of its deployment can be the source for processes of remembering, contestation and protest.

2.5.1 Tremors in the air

Returning to where this literature review began, for Sloterdijk, gas warfare brought to bear the embodiment of modernity: where the 20th Century dawn in the confluence of the characteristics of "terrorism, design consciousness and environmental approach" (Sloterdijk, 2009:22) and then utilised them in conjunction to invent methods of killing which "consisted in targeting no longer the body, but the enemy's environment" (Sloterdijk, 2009:14). The understanding was that in exploiting changes heralded by the industrial age (and the industrialised mechanisms of slaughtering more and bigger of everything) and combining expertise in scientific subjects with understandings of mass production, there was now an opportunity to transform 'battlefields 'into 'battlespaces'. For example, new understandings being shared regarding chemistry, or new chemicals being identified were not simply benign scientific discovery or academic progress, but the opportunity to harness previously unknown concepts to enhance and produce violence on a rapidly escalating scale. Other advancements in methods of mass-production, including that of the factory line, led to the subvertification of such increases in production to become increases in destruction, exemplified by the invention of the modern slaughterhouse (Pick, 1993) and the guillotine (Allen and Shavell, 2005).

The dawn of modernity also fundamentally changed geography, as well as changing geographically. By exploiting airs and atmospheres as a weapon, humans were able to alter the spatiality of war. It also removed an element of the skill - certainly with regards to targetry and strength. Before the advent of modern warfare, where weapons were dependent on favourable conditions; for example, Zeppelins required good air speed and stable winds, submarines needed favourable currents and the cover of low mists on the seas; as well as the early deployment of gases being dependent on wind strength and direction. In WWI, countless casualties occurred when the wind direction was misjudged, or changed, following the release of a gas. To see the rolling mists blow back into one's trench must have been one of the most sickening sights in combat, and cause for a new, nebulous terror. "By working on the enemy's environment, these new processes, which consist in suppressing the basic prerequisites for life, yield the contours of a specifically modern, post-Hegelian concept of terror" (Sloterdijk, 2009:15). Here, the vector of such terror is also the only source of respite: the air that our bodies rely on. Therefore, the terrorism of gas warfare exposed the fragility of humanity with regards to the utterly essential reliance combatants (and all

humans) had on drawing clean, fresh breaths. This remains to be the enduring impact of tear gas use today – that whatever circumstance we have encountered it during, it compromises our relationship as humans with our surroundings and makes perilous the fundamental act of breathing.

The milieus could be manipulated into bringing devastation through this 'atmo-terrorism', or "black meteorology" (Sloterdijk, 2009) or 'lethal mists' (Taylor, 1992). Gas weapons or gas warfare was just one element within the context of "military aeration and weaponised air… Balloons, airships, aeroplanes, rockets and suchlike have all given rise to what Peter Sloterdijk (2009) has aptly called 'air tremors' or 'air quakes' (Doel, 2017:107). This 'atmoterrorism' is effective whether it is poison gas or tear gas being utilised, as the poison gas achieves the aim of eliminating that which it touches and affects, and tear gases "trick the body into experiencing death and dying. The effectiveness of their terrorism lies in their ability to use milieu against the body" (Nieuwenhuis, 2016:512). Therefore, I make the concrete assertion that tear gas is a part of this effectiveness.

2.5.2 Harnessing the tremors

Taylor considers the role of the state as 'atmo-terrorist': the actor behind the co-opting of atmospheres as a weapon of subjugation, and questions specifically why tear gas is being deployed with such fervour and frequency in Bahrain. "Such deployment of non-lethal agents against citizens deemed to be "rioting" is performed so routinely that it rarely draws an audible level of public debate. Fundamental questions remain about why the use of toxic agents on the battlefield is subject to more stringent rules than the control of a state's citizens." (Taylor, 2012). The nature of state control, and aspirational harms the state can wreak upon its citizens is explained by Nieuwenhuis almost entirely: "gassing entails a means to modify the material composition of the aerial environment with the purpose of targeting both the biology and the behaviour of the breathing body. Terror becomes as such a travelling materiality induced into the body through the medium of air and the practice of breathing." (2016:502). This is harnessing those air tremors, shaping them into larger and more destabilising quakes.

From Ypres, where the air "was in fact weaponised to deliver incapacitation and death to the enemy in the form of a deadly green cloud" (Adey, 2014:124) to

Vietnam, where tear gas use is discussed in Roger Eardley's chapter in Toxic Airs: Better to cry than to die? (Eardly-Pryor, 2014) as he introduces the controversies of tear gas use by American military forces and in American cities during the 1960s and 1970s. After the conclusion of WWII with no mass use of gas as a weapon, and the dissipation of the Cold War with no mass use of weapons, the CWC and various organisations which had lobbied so hard for their survival and legitimacy were left sitting on a stockpile of a compound they believed to be useful - and most importantly, marketable. There are links in the rhetoric of tear gas use in Vietnam to some of the justifications made by German scientists involved or aware of the creation of compounds such as Zyklon B - that they were doing so to further developments of pest control (Harris and Paxman, 1982). Tear gas was commonly use to 'flush out Vietnamese villagers' and 'separate them from insurgents' (Eardly-Pryor, 2014) in a rhetoric filled with the familiarity of the term 'flush out' to domestic pest control and ideals of environmental cleansing. This construction of tear gases as a tactical advantage for American assaults on Vietnamese villages and villagers enrols the thanatopolitics discussed by Schmidt, where "Chemical warfare, they realised, was not so much about killing people but about incapacitating them for a duration of combat activity" (Schmidt, 2015:40). Thousands of these temporary surrenders were meted out against the Vietnamese through the use of tear gas amongst other chemical weapons. "If one has to breath and therefore the refusal to inhale the toxic gas quickly reaches a point of inevitability, yet this ultimate acceptation of the gas's effects is perceived as a form of surrender to the weaponized changes of the atmospheric conditions (Theophanidis, 2013).

Whilst considering this in the context of space and place - territorial and atmospheric constraints at which geography can be inferred and categorised, identifying a 'unique exposure 'is possible through considerations of temperature and humidity, which are invoked as serious factors affecting the severity of tear gas irritant properties. During a training exercise, nine US Marine Corps members were taken significantly ill, admitted to intensive care units and reported symptoms of trauma, ultimately to be diagnosed with acute hypoxia. The reasons for their condition transpired as being an unusual reaction to CS gas exposure, on a hot day - with temperatures at 21 degrees Celsius and humidity at 91%, as "symptoms are exacerbated in hot or humid weather" (Hu *et al.,* 2000:236). This 'extra' effectiveness of tear gas, where "conditions that favour medically important injury include excessive

application, prolonged exposure, and (for skin reactions) high temperature and relative humidity" (Hill *et al*, 2000:236) conspired to cause the USMC personnel to perspire more, opening the pores and providing more liquid on the surface of the body for the molecules to attach themselves to, and to affect. This is well understood as a particular feature of tear gas deployments, where the effectiveness is informed by climatic conditions. There is a notable absence of data about tear gas deployments in cold climates, yet tear gas is used weekly in the Occupied Palestinian Territories. Many places where tear gas use is frequent are spaces of contested power, occupying strategic fronts or are sites of significance to religious or ethnic communities such as the al-Aqsa mosque in the Old City of Jerusalem, on the southern part of the Temple Mount site, but also happen to be in countries with a hot, humid or otherwise temperate climate. "The qualities of place that makes them good strategic tools of power simultaneously make them ripe for resistance in highly visible and often outrageous ways" (Cresswell, 1996:164). There is much more that could be said on the nature of vertical geopolitics in Jerusalem alone, but even if thinking only of the fine, fair and stable conditions of a Mediterranean climate we see how the air-ography of a place can be utilised to cause or exacerbate harm to the people in it.

Adey challenges the conception of volume and asks if it can be constructed in other ways, rather than reducing it to "strategies of territories" (2013:53). The interactions between air and other elements come into play here, particularly when thinking about tear gas and the effects it has when mingling within and on our bodies. Tear gas exacerbates some human effects - the production of mucus, saliva and lacrimal fluid, but it is also exacerbated in turn by the human body - when protesting or simply being in the space of a tear gas deployment (a ragged and constantly moving volume) the effects of exertion or motion will cause a person to sweat. What should be a natural defence mechanism and cooling system for the human body becomes that which is the physiological weakness that tear gas exploits. Air is therefore inextricably tied to water in our understanding of the bodily response to being tear-gassed - we are wet beings, being composed of up to 60% water yet reliant on over 2000 gallons of air per day (Pleil *et al*., 2021) and these volumetric, saturated geographies draw together in an atmosphere which transcends one element.

Returning to Anderson's assertion that there is nothing which is not atmospheric, or nowhere that an atmosphere could not be teased out into the grasp of

our imagination - clearly protest atmospheres meet this assertion as they press upon us and 'envelop' those within the vicinity as well as include / exclude by virtual of the collective imagination whole worlds of supporters crying solidarity. In Twitter and Tear Gas, Tufekci enrols an atmosphere of hashtag solidarity, where digital spaces felt as if they were connected by the same tides of protest and resistance, united as in a 'town square' negotiating the same clogged and contentious atmospheres. Exploring atmospheres and geographies of volume has been a useful way to understand how the experience of tear gas is conceptualised as atrocious, terrorising and devastating; with chemicals swirling around on the very gusts and puffs of our most necessary life-ingredient. Moving forwards into the final section of this literature review there is also the opportunities to consider how affect, when attached or considered with atmospheres, will help us "to reflect on affective experience as occurring beyond, around, and alongside the formation of subjectivity" (Anderson, 2009:77) particularly through remembering and retelling.

2.6 Memory, postmemory and remembering

This next section of the literature review will explore geographies of memory in a departure from the critical geographic, poststructuralist sections prior to this, where through a process of continued critique there are ways and means to explore the sensations implicit in our understandings of tear gas's affect, power and constructions - or deconstructions. This section will move from the poststructuralism into considerations of phenomenology whilst also exemplifying "the core concerns of geographical inquiry - focusing on linkages between people, place and culture" (Drozdzewski *et al.,* 2016:447) as we explore geographies of memory, and how they can help us to unfold our understanding of the presence that tear gas occupies within memory. This section also allows for an outline of the ways in which witness can be borne throughout research – including some of the emotional responses to witnessing, enrolling feminist and emotional geographies also.

For most people who experience it, tear gas is a temporary discomfort, that fades over time until it is unmemorable. However, that is by no means the only outcome of exposure to tear gas use, and thus in this section there was a desire to interrogate how geographical literature constructs that process of encoding the sensation of an experience as a memory, as well as what is done to / with it.

Geographies of memory are also influential in the design of the methodological approach, tied in as they are inextricably with accessing, understanding, and making use of the archive, which in itself is a construct of national or collective identity, as much as memory is.

2.6.1 We can remember it – memory geographies

"Memory informs the informs the construction and maintenance of identities (personal, national, and supranational) post-conflict and post-war, and how these identities are drawn upon and articulated through place" (Drozdzewski *et al.,* 2016:447). Though, rather than thinking solely of the macro-scale 'post-war' or significant conflict, it is possible throughout the empirical chapters of this thesis to emplace considerations of memory in a micro-scale too. How do one person's recollections and remembrances influence the process of commemoration, of place-making or re-making, and what does that do to our collective understanding? "Memory and its representations touch very significantly upon questions of identity, of nationalism, of power and authority" (Said, 2000:176) and throughout the empirical chapters which follow, particularly Chapter 4 which addresses sites of memory or mourning, whether institutional or informal, this much becomes apparent. There is more emphasis in the literature on how memory informs the processes of nation-building or (re)imagining of national identity, including banal nationalism (Billig, 1995) than there is focus on how geographies of memory contribute to an individual reclamation or understanding.

The contributions of historians as well as geographers to memory also help us to understand how concepts of remembering, or forgetting, can be created and transformed over time. From "true memory, which has taken refuge in gestures and habits, in skills passed down by unspoken traditions, in the body's inherent self-knowledge, in unstudied reflexes and ingrained memories (Nora, 1989:13) we have moved into an understanding of modern memory which is "self-conscious, historical, individual and archival" (Johnson, 1995:54). Modern memory is the dominate style of remembering and aligns with a rise in political arguments concerning the nation state, as well as how that can be shaped through 'collective amnesia' (Hobsbawm, 1990) and this exploration pays particular attention to how this amnesia may be selected, promulgated and challenged through the ongoing process of nation-building as aligned to the statues, sites and construction of the spatialisation of public memory.

Memory studies is a powerful discipline which crosses the divide between geographic thought and historiography, also encompassing slow, reflective and empathetic feminist geographies and wider thoughts within the humanities and social sciences. Crucial to the development of literature on the subject was the 'memory boom' of the 1990s, where research interests utilised memory and remembering in order to open new ways into understanding a wide range of subject areas. "In Britain, the 'memory boom' of the late 1990s was fuelled by quite specific political, economic, and cultural preconditions in which greater affluence and government investment coincided with a recognition in society about the importance of 'traumatic memory'" (Schmidt, 2015:408). Central to the quest to (re)open memory as a school of thought was the passing of a number of core figures associated with 20th Century conflict and asking "how that 'sense of living connection' can be, and is being, maintained and perpetuated even as the generation of survivors leaves our midst" (Hirsch, 2008:104).

Not all scholars were appreciative of the memory boom and the efforts to open up cultural histories to interrogation. The critique of the memory boom first concerned who was tasked with forming or sharing memory, asking why "to construct powerful narratives of suffering and victimhood, those self-appointed and often state-controlled agents in charge of memory production require a contextual framework within which commemoration can take place for a group of psychologically harmed or persecuted people." (Schmidt, 2015:408). He goes further in his criticism, and near total dismissal of the memory boom: calling it that which has been "conceived and promoted by a new generation of cultural historians under the tutelage of their master prophet Jay Winter, who today have usurped for themselves the position of comptroller of state-sanctioned - and state-funded - 'historical knowledge', has produced little more than a 'countrywide bowdlerization of memory', an inauthentic heritage industry for an inauthentic land." (Schmidt, 2015:409). As critiques go, it certainly draws attention.

Memory geographies were influenced significantly by the contributions of two Assmanns. Jan, first, made a distinction between "two kinds of collective remembrance, "communicative" memory and what was termed "cultural" memory. Communicative memory is "bio-graphical" and "factual" and is located within a generation of contemporaries who witness an event as adults and who can pass on their bodily and affective connection to that event to their descendants… At the same time,

as its direct bearers enter old age, they increasingly wish to institutionalize memory, whether in traditional archives or books or through ritual, commemoration, or performance." (Assmann, 1997 in Hirsch, 2008:110). This was followed by a further unfolding of the detail of types of memory by Aleida - with the addition of the categories of individual vs family, then national and political vs cultural and archival (Assmann, 2006). Memory is a powerful communicator of sentiments regarding the "vexed issue of nationalism and national identity, of how memories of the past are shaped in accordance with a certain notion of what "we" or, for that matter, "they" really are" (Said, 2000:177). This connection to the 'they' of memories becomes apparent when examining some of the examples which are now detached from living witness. Moving to more recent work on memory geographies, there are efforts to situated memory geographies within the non-representational turn, or conceptualised areas of thought such as the performative or affective. Jones argues that richness arrives "from the legacies of the past carried into the present, not least through memory" (2011:875)

2.6.2 We can remember later – postmemory

The core concept within this section of my literature review is postmemory: a mediated, qualified memory which arises from the interpretation of witnessing from others, rather than a direct connection to evidence from our own experiential past. Postmemory was identified by Marianne Hirsch in the 2000s, a coming together of her research on generational differences in recollections and experiences, and focussed around the generations which were once- and twice- removed from the atrocities of the Holocaust, connected to it primarily through photographs and ephemera. Hirsch challenged "the ethics and the aesthetics of remembrance in the aftermath of catastrophe. How, in our present, do we regard and recall what Susan Sontag has so powerfully described as the "pain of others?" (Sontag, 2003)" (Hirsch, 2008:104) and how is "that 'sense of living connection' … maintained and perpetuated even as the generation of survivors leaves our midst" (2008:104). Hirsch's answer is that we are still able to witness and engage in a process of remembering by adopting and acknowledging the second-generational nature of what we have not participated in. "Postmemory is a powerful form of memory precisely because its connection to its object or source is mediated not through recollection but through representation, projection, and creation— often based on silence rather than speech, on the invisible rather than the visible." (Hirsch, 2001:9)

Postmemory has undergone contestation as a term, and Hirsch has invariably had to re-define and re-situate it over a number of years, at each pass unfolding more of the understanding of how it both emplaces and displaces knowledge and our sense of personal, cultural and national histories and heritages. There is a reiteration that postmemory is "a structure of inter- and trans-generational transmission of traumatic knowledge and experience. It is a consequence of traumatic recall but (unlike post-traumatic stress disorder) at a generational remove." (Hirsch, 2008:106) and the clarification that, of course "we do not have literal "memories" of others' experiences, of course different semiotic principles are at work, of course no degree of monumentality can transform one person's lived memories into another's" (Hirsch, 2008:109). Through the work of a number of others, however, she reiterates the value of postmemory as a method of transmission, aiding our understanding about how future lives are lived in a connection with their respective ancestries. Whilst most terms evoke a backwards, look; including "inherited memory," "belated memory," "prosthetic memory" (Lury 1998, Landsberg 2004), "*mémoire trouée*" (Raczymow 1994), "*mémoire des cendres*" (Fresco 1984), "vicarious witnessing" (Zeitlin 1998), "received history" (Young 1997)" (Hirsch, 2008:105) there is also a compelling pull forwards, considering how postmemory helps to shape how we change and are changed by the world around us (Anderson, 2005) as well as what the world around us does to the transmission of memories.

What we can take from postmemory is what we are left with: "second-hand accounts in combination with imagination" which produce "an affective force similar to experiencing a location directly" (Jones and Osborne, 2020:188). This force, sometimes embroiled in the concept of haunting, "is a matter of recovering the traces of unprocessed experience from the past – whether our own or that of our forebears – and somehow making them more manageable, 'binding' them into a meaningful encounter or narrative structure (Frosh, 2019:159). This thesis is exemplified by being engaged with others' experiences, as well as the process of considering what has not been personally witnessed, but takes on significance through creative engagement (Jones and Osborne, 2020). Core as a concept throughout the process of identifying site that show or tell experiences of tear gas use was postmemory: where "events that we have not witnessed can be seen to have an affective pull upon our lives" (Jones and Osborne, 2020:188).

Memory geographers are certain that visual methods are an aide to memory studies, and the formation of shared, invented or postmemory. “The phenomenology of photography is a crucial element in my conception of postmemory” (Hirsch, 2008:107) because it helps connect back with a witness who may no longer be there to relate a story or pass on the experience. In fact, postmemory is a form of “received memory [and] distinct from the recall of contemporary witnesses and participants” (Hirsch, 2008:106). This gives us something which is transmitted and created, where the process of imagination brings new perspective to a sense of recollection which is constantly changing, influenced by those originally party to the actions as well as those engaged in vicarious witness.

Considering the medium of transmission of memory was a useful methodological approach, and is discussed further in Chapter 3. Landscapes and memorials are an important vector for the transmission of postmemory, being that sites of commemoration are “established as a part of a process of archiving memory. Spaces of memorialisation are curated to act as a symbol of a past that will shortly pass out of living memory” (Jones and Osborne, 2020:190) and like Nora’s notion of *lieu de mémoire,* such sites occupy a space between memory and history precisely because “there are no longer *milieux de mémoire;* real environments of memory. (Nora, 1989:7). “We cannot know what it is like to experience the Holocaust, but listening to testimony, looking at photographs, visiting sites and so on transmits information to us so that we can imagine what that experience may have been like” (Jones and Osborne, 2020:202). In addition to the sites of memory conventionally designed for that purpose, all media can be enrolled in the materialisation of remembrance “for example, texts, images, (social) media” (Garde-Hansen et al., 2017:385) and proliferate far more widely amongst audiences outside of those who create or most closely identify with them. This can lead to what they describe as “the mediated public sphere” (2017:385) of memory, and simultaneously the enrollment of outside participants in the memories being promulgated – a way to bring an audience into and along with the memories in a key concept for this research, the act of vicarious witnessing.

2.6.3 We can remember it for you – vicarious witnessing

That vicarious witnessing, asking what the experience may have been like, is not invalidated by the nature of being second-hand or inter-generationally removed, or

even engaged with by those who have no direct connection to the circumstances being memorialised or thought on: for Frosh, that is a direct demonstration of the human capacity for empathy as well as the actualisation of psychoanalytic encounter as "being troubled by others' experiences" (Frosh, 2019:164).

Vicarious witnessing of trauma brings with it a complex and difficult situation – that of the researcher as the witness and their positionality. An exploration of the politics of grief through field research formed an American Association of Geographers (AAG) conference panel (2015) and later text by Gillespie and Lopez (2019) where they brought together struggling, grieving, and traumatized researchers. They argue grief is "often central, politically, to the research process and yet this emotional labour and its politics are rarely centered in our work" (2019:8). These tentative steps to a politicisation of grief are entangled in the often-taboo nature of articulating challenge during the research process, but the concept of vicarious witnessing remains a powerful mechanism for sense-making of trauma, despite the obvious detriment which lingers as a risk to the researcher. In response to historical events which may seem too traumatic to conceptualise, vicarious witnessing through the examination of evidence such as photographs, survivor narratives, artefacts as well as the creative output of others allows for the opportunity to "live imaginatively through the experiences of another" (Keats, 2005:171). Further consideration of the vicarious witnessing of trauma will be drawn from such sources as photojournalism, traditionally a medium fraught with the guilt of witnessing yet principles of non-interference, found in the later empirical chapters. Other considerations of the nature of vicarious witnessing of tear gas use can be found in the creative, visual material which is argued to be "central to the idea of secondary witnessing and vicarious trauma" (Simine, 2013:39) and how it is represented in museums which are uniquely placed to engage with, or avoid, narratives of trauma, suffering, witnessing and legacy.

2.6.4 Memory and Resilience

In response to the construction of 'remembering as resilience' by Garde-Hansen et al. (2017) a key theme became clear in the literature connecting the vicarious experience of tear gas use with its impact, and how that impact could be felt far broader and wider than just by those originally exposed to it. This impact speaks to the suitability of tear gas, as a weapon of war, to be utilised for peace-making and policing

practices, particularly in the context of making or maintaining lawful order. In 2022, when travelling to Paris to support their team at the UEFA Champions League Finals, Liverpool FC fans were exposed to tear gas by French authorities who presented a violent and overzealous policing strategy, which has since been apologized for by high-ranking Parisian officials and politicians, as well as roundly condemned in both the official and independent reports into the circumstance. When faced with violent and militarised policing in Paris, a combination of the cultural disregard for the police, government agencies and other state structures amongst Liverpudlians, and the active participation by many in the imagined community of disaster survivors which Liverpool FC supporters have become meant that fans engaged in pro-social behaviour, attempted to hold off crowd surges and manage the crowded spaces within which they found themselves, whilst also sharing advice on how to counteract the effects of tear gas using milk or Coca-Cola. This process was 'remembering as resilience' (Garde-Hansen et al., 2017) in action, where the affected fans connected to the cultural aspects of a shared experiential circumstance, and applied postmemory to their considerations when managing their own vulnerability. "Grounded in their understanding, and for some direct experience, of the Hillsborough disaster, Liverpool fans prevented a fatal tragedy occurring through their collective action. They protected vulnerable fans, appealed for calm, and took care of those affected by crushing or tear gas" (Scraton *et al.,* 2022:15). This was a seminal moment where both my research interests for this project and my full-time job as an emergency planner converged - issues of crowd safety at stadiums being one of the themes at the heart of what my professional career entails – in the practiced and mediated example of how vicarious experience or witnessing can influence the creation of postmemory and strengthening of resilience.

It is also apparent that the concepts are linked, both in the practical application of memory to situations encountered as well as the study of trauma and embodied experience of those who are affected by it. The production of a sense of community or personal resilience, such as that observed amongst the Liverpool FC supporters, comes from their awareness of the experience of others – and thus vicarious resilience is a product of vicarious witnessing, postmemory and the embodied, material agency of collective memories. Vicarious resilience is conceptualised in psychology studies as a constructive approach demonstrated by some who have experienced adversity, and are able to channel their understanding of suffering into constructive behaviours (Hernandez et al., 2007).

2.7 Conclusion

This literature review has constituted a thorough examination of three elements: the contemporary and historic work regarding tear gas, where it sits within particular geographic themes or teachings, and what utilising tear gas as a mechanism to enter certain literatures can bring to bear as new insight. The narratives of tear gas use provoke controversy, contestation and conversation about power, control, security around the world – from its constituent canister to its targeted crowd. Tear gas deployments are rarely observed as contributing to security, and instead; through processes of militarisation of the police, marginalisation of specific communities, and state-centric biopolitical control, tear gas deployments actually contribute to insecurity. This insecurity is perpetuated through its entanglement and interference with protest and how it challenges the status of political life (*bios*) by taking it to the brink of a transformation into bare life (*zoe*).

Scientific literature has given us an - admittedly incomplete - account of the effects of tear gas on the bodies of those subjected to it. Effects are overwhelmingly non-lethal, causing tears, vomiting, and pain, but there are documented examples of death, serious injury, and permanent irreversible harms caused. The naming of tear gas may perpetuate the ideals that it is 'non-lethal' or 'less-lethal' however events occurring across the globe during the completion of this thesis cast doubt upon the validity of those terms: from Liverpool football fans so narrowly avoiding untold tragedy at the UEFA Champions League finals in Paris on where tear gas was used indiscriminately, to the tragic loss of 130 fans at the Kanjuruhan Stadium in East Java, Indonesia on October 1st 2022 and where the Indonesian Co-ordinating Security Minister said that they could not "diminish the conclusion that the massive [number of] deaths was mainly caused by tear gas" (Al Jazeera, 2022).

No complete understanding of the effects of tear gas on the human body exists, in part due to the practical limitations of exposing vulnerable groups such as pregnant people or people with a pre-existing medical condition to a lacrimatory agent so nearly banned under the Hague Convention as a chemical weapon. Historical sociographies of tear gas have been completed, and exposed the parasitic web of actors and networks responsible for the development, manufacturing and marketing of tear gas. Similar works have plotted the global network of protestors and collectives who counter the use of tear gas, by sharing mechanisms of personal protection geared around mitigating

the seriousness of the experience. Feminist readings of tear gas strongly condemn the applicability of it being utilised for public order tactics by police forces around the world without this vital evidence, and without the nuance and multiplicities of understanding how it affects not only the body during use, but the person after it has dissipated, as protest populations are intersectional and will experience this experience differently.

In this literature review, in order to establish and situate this dissertation's subject of focus, the elemental constitution of tear gas was articulated – what is and is not tear gas clarified in order that we may operate from a full, shared and accurate situational awareness. The elemental nature and the objective constituent of tear gas has been explored throughout this literature review in a number of ways: firstly, the scientific, where a large body of evidence compels the conclusion that tear gas causes more harm than is acknowledged or strictly permissable by the governments, agencies and states which deploy it, regardless of intention.

Secondly, taking a chronological approach to structure, this literature review began by exploring the many and varied gas weapons which have been part of actions throughout history. This opened into a section which talked about gas use in World War I, Sloterdijk's 'dawn of modernity' (2009) and the mechanisation of gas killing. From total war to uneasy peace, I then undertook to present about how tear gas became available to policing services, through a short section discussing the actions of lobbyists including Amos Fries. The peri-legality of his work has influenced the current processes of police militarisation, as Fries utilised the absence of convention or framework to argue for the initial take-up of tear gases by bodies intent on suppressing uprising or criminality in their cities as post-war depression gave way to civil rights repression. Here, tear gas was primarily used as a means of subjugation, to make the living of particular bodies more difficult. Tear gas, I argue, is an under-studied tool of biopower: it does not enforce death as in the classical biopower of 'take life or let live', but in the modern sense of the power to 'make live and let die', (Murray, 2008:204) where subjects are protected from the state taking their life outright, told that they are experiencing tear gas use 'for their own good' as a justification that more lethal, conventional weapons have not been deployed.

Thirdly, the chapter was about harnessing the subject matter and materiality of

tear gas as a means of entering the subjects of biopower, violent geographies and atmospheres - it has serviced that purpose but also brought about the reciprocal, promoting an understanding of those themes from which to view tear gas use and challenge its place in society and legitimacy as a mechanism of crowd control and movement suppression. As an inherently biopolitical tool of discipline and punishment, tear gas use evokes the 'air quake' of environmental terrorist milieus, travelling around and into the body affecting the materiality of our being. Tear gas use enhances and compounds precarity, both in the sense of security and in how it exposes "the precariousness of life and our vulnerability to the Other" (Butler, 2004 in Lloyd, 2019:3.)

Lastly, the obvious and pervasive influences that tear gas has on memory, and that geographies of memory have on trauma were captured with sections that drawn symbiotic connections across the subject areas. Conceptualising feminist and emotional geographies of memory through reading around witnessing, suffering and forgetting helped to reframe tear gas as not only a uniquely biopolitical weapon but an impactive and lasting one with implications for not only those subjected to it, but those who undergo the vicarious experience also. Literature on geographies of memory and commemoration speak about the legacy of tear gas use, and how it can contribute to the creation of lasting cultural touchpoints aligned to concepts of postmemory. Enrolling memory geographies also sees tear gas positioned as a temporal dichotomy: not persistent in the air but long-lasting in the consciousness and reactions of those who engage with it.

In the subsequent chapter, more literature concerning cultural geographies will contribute to how the process of research design has been approached, which will support this chapter in together constituting the foundation for the exploration of the vicarious experience of tear gas use.

3 Methodology and research question

"If something is to stay in the memory, it must be burned in: only that which never ceases to hurt *stays in the memory"* (Nietzsche, 1887:II:3)

3.1 Introduction

Previous chapters have outlined the ways in which tear gas has been understood, conceptualised, but ultimately neglected by scientific and political literature over the last 100 years. Typical explorations of tear gas exist in medical journals, where the immediate effects of tear gas use are articulated by observation on an over-examined and unrepresentative demographic of affected persons. Feminist geographies call for fully informed, deliberate examinations of the ways in which the body, emotions, and the nature of intersectionality impacts on the tear gas use experience, in order to prompt a reconfiguration of the permissibility that it occupies within international law and conventions. That is the first and strongest conclusion that the review of the literature gives us, arguing that the multitude of methods for reading and understanding tear gas shows that it is a complex and vital topic to be engaged in studying in an attempt to explicate.

The literature review also offered a way into reading tear gas use, through how it is memorialised and commemorated, including an examination of the actors and relationships which are involved in practices of commemoration and contestation, including the archive, museums and memorials, as well as concepts in political and historical geographies such as postmemory. From the start of the project, though methodological approaches varied, my interest was largely consistent in a question that ultimately provided the overarching research framework: does tear gas have a justifiable place in police public-order tactics and continuing use into the 21st Century? Furthermore, how can we make a judgement of this, using innovative and creative ways of determining truth from the evidence of experience?

This chapter provides both the theoretical background and practical justification for the methodologies utilised throughout my exploration of the research question in the three empirical chapters to follow, referring back to literatures throughout. It is divided into two main practical sections, outlining the engagement and interpretation of the research methods present and involved in this piece of work, and the methodological approach which was utilised to critically analyse the data

gathered from a large range of empirical sources and laid out in the three thematically structured chapters which will follow. Regarding archival, ethnographic, and visual research methods, a small review of current thematic literature precedes the detail of these processes were incorporated into the methodological approach, and a reflection on the successes and limitations of these research methods brings the chapter to a conclusion. Whilst the desire is to organise this chapter in a way which is both logical to read, it also represents the meandering pathways that the research often took, with honest meditation on the research process as a whole as it spanned a significant amount of time and encountered various challenges, not least of all over a year of travel restrictions during the data collection phase. In doing this, there is an open and frank discussion about the dynamics of research (re)design, how 'plan B's' are formulated, and rumination on how the Covid-19 pandemic impacted the access of public spaces like museums and memorials, including how they were explicated for digital explorations, contributing to a (re)opening of knowledge.

There are inherent difficulties when it comes to studying tear gas - issues of fear or harm pervade alongside ethical considerations, the suitability of conventional research methods, and an underpinning barrier to utilising many primary sources of material which have access control or egregious information classification level. There is also the fundamental nature of tear gas as a weapon causing trauma to those who are exposed to it. Bearing witness to traumatic events which are then re-experienced during the research process was shown by Lopez and Gillespie (2015) to be a common, though taboo and rarely articulated, aspect of geographical research, and in providing the necessary safe space for exploring the implicit and irrepressable harms which are absorbed by researchers, as well as what it means to grieve they were able to consider what place there is for critical research during, or adjacent to, suffering. When considering a material that is legally unavailable to study in its primed form; a material that could cause significant, permanent harm to the body when exposed to it, and a material which is almost wholly controlled and possessed by police and military sources, as well as naturally secretive manufacturing and production companies. It was not assessed that simply utilising this thesis to reframe the extant binaries of tear gas use would satisfy, thus it was necessary to set out to utilise multiple methodological approaches, which yielded nuanced and plural angles to the subject. This took the work from a simplistic approach into something which could be quantifiable and measurable, into the utilisation of artistic examination which brought new ways of

making tear gas visible, as well as the gentle and cautious ways in which vicarious witnessing helped shaped the understanding of what tear gas does. Far from the production factories of Combined Systems Inc. or similar military contractors who are major tear gas manufacturers and suppliers, and the invisible entanglement tear gas weaves in global shipping systems or political interventions in weapons legislation, the focus could shift to the post-use state of tear gas - its afterlife - by exploring how it is recorded and remembered to tell a story about it; to bring it back to life.

3.2 Research design

Geography was always the subject which felt most open – to engagement, interpretation and invention. There is no doubt it holds a broad spectrum of research areas, and has shifted and morphed over time, sometimes ebbing and flowing with trends - topics making breakthroughs in new areas of methodological application or understanding - but mostly growing, as the discipline expands its areas of focus, both spatially and temporally. Throughout the approach to research design there were opportunities to consider the nature of geographical research and most effective place for this research to sit amongst schools of thought and narrative interpretations of the questions that geography poses. Having engaged with several sub-disciplines of human geography and considered a number of research methods prior to the formation of a research strategy, research design and research question helped to ensure that not only was this work situated appropriately, that there would be a meaningful contribution from it to the production and expansion of knowledge of the subject area and beyond. Looking at tear gas in the context of memories and experiences allowed so many other themes in human geography to be drawn into the mix, circulating and all contributing, whilst also providing a new angle for exploration.

Key in the process of research design was a concern with place and space, as well as the pervasive effects of the experience of tear gas use on the female body, placing an emphasis on feminist readings of the subject. This had the potential to lead to exposure of new and previously hidden mechanisms of interpreting tear gas use, as the vast majority of state-sponsored articles and investigations of tear gas use come from male- dominated research teams, examining the effects of tear gas on male-dominated demographics including regiments of the Armed Forces and public-order policing units, which I encountered to various degrees during my career as an obstacle to the understanding of duality within experience. An aversion to the ‘default’ and the

'status quo' significantly influenced a number of assumptions which were made in carrying out this research, leading to the decision to actively seek out sources other than official narratives of tear gas use - especially those centered around artistic methods of retelling – in order to explore if there were differing perceptions to the experience of tear gas use. "In reflexive social science, within which practitioners are well aware that each research site presents its own unique challenges, the onus is placed upon the individual researcher to make the case for why they organised their studies as they have" (Flowerdew and Martin (eds) 2008:2) which leads to the articulation of both research methods and research questions contained in this chapter, as well as an unfolding of the assumptions inherent with my selection of sources and process of interpretation. "Any piece of geographical research is based on philosophical assumptions or choices." (Flowerdew and Martin (eds) 2008:8) Posing a question about the legitimacy of tear gas use and the significance of its impact on the humans it is used open has to generate an answer, even if it isn't the one I feel comfortable with. The knowledge has to be warranted - justifiable as having come from a place of understanding related to the question which was posed, and thus an assumption was created that from a broad and deep examination of the vicarious experience of tear gas use, the opportunity to divine a sense of its impact would arise.

3.3 Archival research

The first methodological approach that will be discussed in this chapter involves the archive and engaging in analysis of archival material. This is a well-understood and established research method in human geography, which has significant advantages for those engaged in the pursuit of historical knowledge or contemporaneous evidence. There are some limitations to archival research, which, too, are well-discussed in literature. In my thesis, the use of the archive brought me a powerful stability, a foundation upon which further analytic endeavours could be constructed and different research practices engaged, as well as the opportunity to access worthwhile material artefacts which I centered my stories around, as they provided powerful evidence for the human experience of tear gas use and were ripe for further interrogation.

Taking stock of the length of time that tear gas has been developed and utilised for, it was a necessary process to begin my research in archives, looking for material that spoke about the origins and early uses of tear gas. Tear gas as a product is not

legally accessible to the layperson, constituting a Section 5 Firearm[1], and accounts of tear gas use tend not to be visible to researchers, fraught with considerations of ethical and trauma-informed research strategies. The archive presented an accessible mechanism to access visible material associated with tear gas use, where the nature of curation, collation and care meant that I would be able to accumulate sources of data that could then be utilised for comparison to begin the discussion contained within this thesis. Archival research methods are broad and are often used as tools to support other research strategies (Ventresca and Mohr, 2002) and this meant the approach of beginning in the archive was both logical and useful. The authors characterise three modes of archival research in their understanding of organisations, differing conceptual approaches which are influential in developing methodological rhyme and reason. They argue that the historiographical approach, where attention is paid to the richness of detail this allows for ethnographic studies to emerge from the medium of engaging with archival research, which most strongly resonated with me during this project.

As a mechanism of exerting control over an environment and the bodies within it, tear gas was first utilised as a weapon of war, in order to harass the enemy and force them to spend valuable fighting time engaging with complicated or convoluted gas protection materials, or to cost them the sharp-eyed capability to be effective in targetry or decision-making. As with many the objects or emplacements in the field of military power, tear gas enacted control - from a distance. This was paralleled by how tear gas use could be dictated using official documents - orders - or noted by any one of an emerging tidal wave of pieces of documentation such as memorandums, administrative papers, technical information texts and the paper ephemera of warfare. Yates (1989) calls the rise of official documents like memos part of the infrastructure that provides and administrates control from a distance; looking at the large-scale modern organisation has immediately parallels to the militaries of WWI attempting to scale a command and control infrastructure on different levels, with variable spatiality and temporality. Knowing of the existence of official military documents in a number of archives led to the assumption that their examination would provide one perspective regarding tear gas use from WWI to the present day, and thus I set out to find collections of these, knowing that it was most likely that they would be preserved by

[1] The Firearms Act 1968 prohibits possession of CS spray, though not unlawful for a police officer to possess CS spray when acting in the capacity as a warranted Police Constable

other (conflated or conflicting) forms of state information generation and control like official archives, which were my first port of call.

I determined the archives that it would be necessary to visit, and engaged with their digital footprints first in order to find a way into the space. The advent of digital collections, accessible from anywhere to a researcher, would have been a far cry from the imaginations of Caygill (1999) and Myerson (1998) as they considered the impact that the world wide web would have on opening up the archive. Far from dissolving the credibility of the archive, accessing material digitally was a useful step, which did not necessitate travel to a particular location and afforded me the opportunity to maximise the time I did spend in a particular location, as I would go with a firm knowledge of what would be available and what I required as a priority, knowing that it could not be found online. Clear and accessible instructions on how to visit the archives I chose were available on their respective websites. Subsequently, I carried out searches of archives including the Imperial War Museum, Commonwealth War Graves Commission, Victoria and Albert Museum, The Wellcome Collection, and the National Archives.

Archives are thought of as 'source of sources' but also can become understood as a specific place where secondary sources are generated - as experiences of the archive and new methodological approaches to exploring them are legitimate empirical understandings in their own respect. Research that speaks to interpretation of the archives has been characterised as a move from "extraction to ethnography" (Stoler, 2002:86) whereby archives can be further understood "not only as collections of sources but as sites: geographical spaces that have particular challenges of access and are therefore worthy of analysis in themselves" (Siener and Varsanyi, 2022:549). Their scholarship explored the themes resulting from a conference panel at the American Association of Geographers 2021 conference, where they had asked geographers who worked in archives for their dialogues and experiences. This had been a consideration of earlier research including the activities of Schwartz and Cook who asserted that in the archives, "the past is controlled. Certain stories are privileged and others marginalised" (2002:1), Lynch who asserted that archives are "sites of historical struggle" (1999:65) and Kurtz who asserted that archives were the situated practice of the negotiation of knowledge and power (2001).

In ‘Tales from the Archive’, Moore considers ethical issues in historical geography research, countering Goheen’s (2001:78) comments “that historical geographers have had little to say about methodology” (Moore, 2009:262) whilst also arguing for a development of the debate regarding research practices in historical geography. She notes that “the archive looms large in the imagination of historical geographers” (2009:263) but that the archive is deeper and more disorganised as a research area than conceptualising it as a ‘repository’ (Brown and Davis-Brown, 1998:21). This chimes with my experience of accessing the archive in the Commonwealth War Graves Commission headquarters in Maidenhead, which was both workplace and storage facility, living displays and preservation methods encouraging stasis.

Issues of preservation abound, including how boundaries, silences and containments are encountered (Till, 2001:72) or how partiality features in the archive through which kinds (powerful vs powerless) voices are encountered as well as how the preservation is created and sustained, as the production and maintenance of an archive are a social process subject to the construction of power (Duncan, 1999; Kurtz, 2001; Ogborn, 2003). Moore echoes Lorimer (2009) in asking why there has been “little discussion of research practice for sensitive or controversial subjects” (Moore, 2009:264) and how navigating a resistant archive is undiscussed. The assumption that things will be as ethics and morals would dictate is overriding, and there is little preparing a researcher for encountering significant difficulty when entering the space. Archives reveal themselves to be distorted (through deliberate intention to obscure, or neglect, or accident, or veiling - disguising the truth in an attempt at ensuring survival) and the role of the archivist can be in perpetuating or challenging these manners of resistance. Balancing issues of consent, privacy and the necessity to report on details found in the archive, especially when they are sexual, political, violent or traumatic, is part of the “weight of responsibility on the researcher” (Moore: 2009:268) also described by Ogborn (2003) which makes archival research precarious and requiring sensitivity. This is also felt when considering the politics of the archive, as discussed by Duncan (1999). The more time I spent in and with archives, the more they revealed - both intentionally and unintentionally. The most minute or inconsequential detail could reveal more about the object or source afterwards, owing to a later reflection; and intentions when going into the archive aligned to my anticipations or assumptions were rarely realised fully, or actualised in relation to what I encountered.

3.3.1 The disobedient archive

As I explored the availability of representations of tear gas use, I was frequently drawn to archives. After all, "what isn't an archive these days?" (Comay *et al.,* 2002:12) Whilst there are overt and complex criticisms to be made of archives - how they embody state power and authority through the creation or curation of official (often uncontested) narratives, can be sites of complex ethical dilemmas and decision-making, and contain hidden bureaucracies, the engagement with archives was such that I felt they were imperative in the sustaining and sharing of understandings of tear gas use and experience, and they became my starting point for entering the research.

Archives are uncontrovertibly sites of power (Jimerson, 2009:2) and institutions which use rules, including creating limitations and putting into place categories which contributes to a reordering and replacement of material, as Derrida argues in Archive Fever (1995). Those rules can constitute hidden bureacracies, and the etymology of archive itself even speaks to those bureaucracies and secrets: "in Spanish, a figurative meaning of the term *archivo* is a person to whom is entrusted a secret or private knowledge (and who knows how to guard them)" (Withers, 2002:304). This guarding and control, which can often be state driven, is exerted over both access and artefacts, as maintaining large and rich collections of material requires both significant capital and effort. Even digitised archives, intended to democratise access, still require human maintenance and the investment in conversion, which means that the site holding the archival material requires income in order to carry out these tasks. There is a significant disparity between the archives of a non-state-funded group or site, and those enjoying rich, famous and powerful benefactors which will likely be the largest - and most well maintained - require both the funding which is rarely possible from private sources as well as the legitimacy to grow and acquire new material.

Another reason for disparity existing in archives falls to the staffing and social power structures which can be found there. State actors may have reasons for allowing or disallowing access, just as workers who attain positions of responsibility or governance of an archive may have personal or professional approaches to restricting access, potentially to influence the production of a certain interaction with the archive. Those hidden bureaucracies are considered by Tesar; "therefore, the power of the

guardians, I argue, is exerted not only in protecting the documents, but in controlling and shaping the research subject; by allowing the researcher to access some materials, and not others" (2015:105). I reflected on this throughout my experiences accessing material in person and via digital means at the archives I encountered, and whilst (thankfully) I do not believe there were instances where my approach was subject to restriction or gatekeeping, I can wholly understand where those encounters may arise.

Being pressured to process data - access boxes or files quickly - outside of the timescale that a researcher may feel comfortable with; being pressured to stick to what was requested with no deviation or expansion - even if the explication of a subject was directly due to material encountered; or being pressured to select data in advance with no guidance — all of these facets could conspire to make the archival research experience tumultuous and unfruitful, and a place where Echevarria's description: "power, secrecy and law stand at the origin of the archive" (1990:31) becomes a self-fulfilling prophecy.

It was important to consider the ethics of the archive, especially knowing that the material that I wished to engage with was awash with violence, pain and suffering. The archive can be a complex place to navigate ethics and truth within, as Tesar states. He drew on "experiences as an archival researcher, on the power and politics of the archival institutions, and on the complexities of the ethics of research when dealing with sensitive histories of communities" (2015:101). His conceptualisation about 'opening the box', like a transgressive archaeological discovery, resonated with me - "having been discovered, the ancestors demand attention. We cannot simply close the box and leave them alone again" (2015:101). Invoking the mythological tale of Pandora brought an interesting angle to the navigation of archives as a source - what if they were to spill forth material that would be too difficult to write about, but could not be put back and undiscovered? I considered what Rose (2008) reflected on, that the process of being in an archive requires as much complex decision-making and the navigation of politics as the process of being an archive, developing and storing material. It was important to develop an ethical strategy alongside the research methodological approach, in order to ensure that I would be able to proceed with the collection of data in a responsible manner, as well as to navigate the process safely myself. Some applications to access archives take time, energy, and financial commitments, or require the constant process of re-applying for access, reaffirming

that there is a necessity to be there, and come with such conditional access that the research becomes precarious.

Archives still present complex ethical dilemmas - ethics is not done away with just because there are no participants to sign informed consent forms - "ethical experiences with the subject and data are essential and inseparable, and that ethical considerations are relevant in archival research" (Tesar, 2015:113). Interviewing or observing live participants may generate more rigorous ethical scrutiny but the importance of respect with regards to the material and codified data of people which is present in the archive carries weight and should still be subject to consideration. Rendering tear gas visually, either through the creation of material that uses imagery of tear gas, or through the museum-based modes of collation, persists as a difficulty affecting this - among all - research on tear gas. Navigating the similarities, differences and dependencies of making the experience of tear gas visible to research influenced the methodological approach and my movement in and out of the archive.

3.4 Geography and the visual

Geography has a powerful relationship with the visual. Most of the empirical examples for each stage of the exploration of tear gas are visual - and they help with the generation of an affective atmosphere of the object, museum space, or historic artefact. Visual geographers like Rose (2001:250) argued that when visual methods such as photography, artistic representation or video are represented within work, there is no reason that they must come secondary to text as a medium for explanation and accounting. The construction of visual methodologies constituted a challenge to traditional ways of seeing meaning – from what was 'told' to what could be 'shown'. Pink supports this argument that [images] "should be regarded as an equally meaningful element of ethnographic work" (2020:14) and throughout the empirical chapters, there was a clear opportunity for the visual representations of the tear gas experience to provide a jumping off point into humour, romance, sadness and the sublime.

When deciding on how to incorporate those aspects of 'seen' experience, the visual metaphors told by films, or the poetic renderings told by murals, I considered incorporating my own digital creations, including photography and short moving videos - popularised by the Instagram offshoot, Boomerang. "Digital video is distinctly

useful to human geography as a research tool … particularly valuable to ethnographic research" (Garrett 2010:521) Photography and video can become geographic research through a number of mechanisms: providing material to be analysed, produced for an audience, recorded for posterity or data collection, material created as reflexive analysis, or collaborative product.

I wanted something that rendered movement and provided more than a simple split-second representation. A significant amount of the experience of memory sites, museums and exhibitions concerning tear gas use relies on non-verbal communication. Yet, interactive presentations frequently use the spoken word to great effect, where the audience is drawn into a narrative cut in order to maximise their attention span and framed with the spoken word. "But what is captured need not necessarily be on such a large scale to be useful. Video can also capture small gestures, expressions and moments which remind us of something intangible, something that may have slipped from memory otherwise" (Garrett, 2010:526) which then when discussed can become Pink's "place-making process" (2008:175) or Witmore's "collage of material articulations" (2004:58). Pink asserts that video has power as mechanism of representation, which does not necessarily require an abject truth. Video can be "used to create memories of places one has never experienced" (2008:13) in both a leap of geographic and temporal possibilities.

Indeed, truth in video or pictorial representation is always subjective, owing to the difficulty of separating the role of the videographer or photographer, who is both observing the scene and in the scene. Truth is less desirable than a representation which can be further interpreted, contested, reimagined and reencountered, making video and photographic representations an effective medium for the delivery of what equates as a source of experience - and then to be experienced themselves. There is a cautionary tale to the process of encoding imagery and video, where memories of experiences can be distorted by representation, as well as presence from those not part of the experience.

3.4.1 Critical visual methodologies

When incorporating such a range of visual sources in research, and engaging with representations of tear gas use found not only in pictures but across oral histories, videos, artwork and film, it was essential to find a mechanism for the consistent and accurate analysis of their contents in order to reflect back on the second part of the

research question; impact. Mechanisms for carrying out visual analysis owe significantly to Rose's engagement with critical visual methodologies, and the outline of three key means of paying attention to the mediums throughout a multi-faceted mechanism of seeing composition, symbolism, narrative, and relationships which are all examined in this research mechanism. Firstly, compositional interpretation, drawing heavily on methods found traditionally in art history for paying close attention to the sources. Primarily, the image (or other visual source) is looked at in order to assert how it is structured – how elements come together in compliment or stand out in contrast, leading to the identification of components, which can be further analysed utilising a checklist. Working through questions of colour, lighting, tone, perspective (including identifying what draws the attention in the foreground, or is relegated to the background) may seem obvious as Rose asserts, but when carried out "compositional interpretation [begins] to say something about an image's possible effects on a spectator… particularly important for methodologies concerned with imagery's effects" (Rose, 2013:73).

Secondly, semiology, which draws upon the structuralist tradition in addition to the discursive explorations of Foucault, is the study of signs. Pierce's trilogy of semiotic vectors are the iconic, the indexical and the symbolic, each enrolling different relationships between the artist and audience, or signifier and signified (2013:76). Such analysis is possible when the elements of an image have been encoded as signs – firstly what they show or portray, and secondly what may be the inherent meaning. Semiology "considers the social conditions and effects of images" (2013:79) but can be contested through explorations of the different perceptions positionality can generate, and how effective the meaning or message is in transferring to recipients.

Applying the nature of the image, the signs and significance present within the visual representation, as well as the third element of critical visual methodologies: discourse analysis – where discourse is "a particular form of language with its own rules and conventions" (Nead, 1988:4) allows for the richest opportunities for interpretation. Discourse may take the form of written texts, accompanying captions or descriptions, or visual sources which incorporate any verbal meaning – such as some of the Free Derry Murals discussed in later chapters where text sits alongside stylized visuals to fully constitute the intended meaning of the artist. Utilising critical visual methodologies throughout the exploration of all sources which were visual or object-based in some way allowed for a consistent and clarified approach to make meaning from what was

observed, opening up the sources to make and remake meanings through their animation to myself as the audience.

Critical visual methodologies were incorporated throughout the empirical chapters in parallel with other research approaches. Having a mechanism to marry impressions gleaned from composition, semiology, discourse and textual analysis together was then supplanted by elements like traces, a construction of the distinction between evidential and emotional, in order to explicate the experience of tear gas use.

3.5 Ethnographic research

Designing a thesis solely based upon the collection and analysis of archival sources did not appeal to me, so during the time period I had allocated for methodological processes to be examined, I considered what else could be brought into being to enliven the research. Whilst accessing material which spoke some way about the embodied experience of tear gas use, it was one-dimensional, which felt unsatisfying. My exploration of the archive, mapping of the temporality and historicity of tear gas use, and even attempts to unearth the previously unseen to expose new evidence of experience was cold without context; "we still need ethnography" (Matthews *et al*., 2005:76) in order to build understanding. I knew that the discoveries from the archive would be enhanced as they were complemented by the context - information we may know from understanding their lived experience at differing scales to what is portrayed in museums and formal settings (Kwan, 2008), hence the desire to also feature a methodological approach that centered upon representation, creation, and reflection.

3.5.1 Sensory ethnography

With regard to the desire I had to experience the experience of tear gas use as retold by creators, curators and critics, it was important to build on the mere experience of something which could be sensed during an event, and see how that translated into something which was reflected on retrospectively, collected, ordered, sorted, processed and taken upon introspectively (Turner and Brunner eds., 1986). The range of experience that is conveyed in sensory ethnography would see the research contemplate vignettes and traces, as well as appreciate affect and assemblage. It would enliven the narrative of archival data, documents which spoke of an experience but did

not translate it in the way that sensory ethnography could prompt "remembering to be constructed as an embodied, multisensory phenomenon that is inseparable from lived experience" (Stevenson, 2014:349). Using sensory ethnography allowed Stevenson to "construct memory as an emplaced, embodied, multi-sensory phenomenon, rather than an internal archive" (2014:335) which was what I sought from the spaces and sites that I had begun to encounter during the data acquisition process, ossifying the methodological approach to memory as a practice. It brought to mind the mechanism of how "material, practiced memories evidence the ongoing co-productive imaginings of people who visit and revise meaningful places, known as sites of memory" (2014:341) where those sites (Nora, 1989) constitute an assemblage of their own.

Reflecting on challenges and solutions in the research, Lahdesmaki *et al* offer further understandings of ethnography, which I engaged with and found provided useful context for justifying the methodological approaches of this thesis. To them, ethnography is "based on the researcher's presence and participation in the daily lives of people and communities, thereby offering various possibilities for encountering and understanding different ways of life and thinking" (2020:xx) and is a "method based on engagement and interaction with people in specific environments" (2020:xviii), which is what was sought as an approach. Going further, and thinking of the importance of incorporating what literature I had identified on atmospheres and experience, as well as having a mind to remember the power of narration, memory and meaning, it was reassuring to see the themes coalesce in the concept of affective experiences: "ethnography is a valid method for studying the affective, as it encourages the researchers 'reflexive attitude and emphasizes the subjective experience of the ethnographer. Furthermore, ethnographic writing that draws on narrativizing the fieldwork experience and reflexivity, offers a fruitful forum for expressing and analyzing affective experiences" (2020:xxii). This approach built upon the found data - documents and images existing in two dimensions - by adding a third: liveliness, through an examination of relations and conditions.

Becoming the tool in practice, not just the mechanism of collection, allowed for an analysis of the subjectivity I embodied and further critical evaluation of my interpretations, my experience and my role in order to create validity to the research (Davies, 2002:4). A "reflexive attitude needs to run through the whole research process, during which the researcher critically reflects on her own position and

presumptions, political engagements in the research, as well as methodological choices. Critical reflection and articulation of positionality become even more crucial when developing and experimenting with new methodological tools" (Lahdesmaki *et al*., 2020:xxiii). In terms of my subjectivity, acknowledging that "the ethnographer is the main tool in ethnographic research" (Murchison, 2010:13) was both necessary and revelatory, affording me the space to expand on, and feel confident in, my personal access and experiences in spaces or encounters throughout the research, demonstrating as well that "subjectivity is embedded in all ethnographic research practices" (Murchison, 2010:14).

Davis offers an insight into heritage sites which were a particular area where my research paid attention, arguing that they can be "approached as poly-space in the sense that they enable and contain different spatial, temporal, affective, sensory and cognitive experiences in one physical place" (Davies, 2002:3) Paying attention to the sounds and the silences, as well as the images and texts, makes a richer understanding of how commemorative spaces are constructed and experienced. Sensory ethnography as a methodological approach was effective for Waterton and Dittmer who were immersed within the space of the museum in an approach of "complete participation that minimised our influence … on the behaviour of others" (Waterton and Dittmer, 2014:127) and demonstrated the effectiveness of utilising ones body as an 'instrument of research' (Longhurst, Ho and Johnston, 2008) (Nicholson, 2012). Experiencing the experience of events portrayed in the museum - for example, engaging with digital screens or observing a performance of The Last Post, was a powerful way to explore the assemblage of the museum. I encountered a number of museums, memories or sites of memory during my exploration of the sites of tear gas use, and conceptualising them as assemblages not only allowed for rich reflections on their significance but an unfolding of their essence. "Space-times are always accompanied by their phantoms" (Thrift, 2008:121) so the everyday social practice of the cultural site - the monument or the museum - becomes entwined with the historical context, and haunting creates "an affective dimension, a dimension that creates a sense of the imminently important, present and disruptive" (O'Riley, 2007:1).

Narrative experience pays reference to the sensory experience of the museum, what they are seeing, hearing, touching and feeling. They conceptualise the memorial and the museum as "an assemblage of objects, the bodies of staff and visitors,

narratives, materials and more, that together shape the visitor experience" (Waterton and Dittmer, 2014:123) and together it is more-than-human, a breathing, changing ephemeral space which, when encountered, becomes the 'haunting virtual'. Utilising the Deleuzean concept of the virtual - where the virtual is "potentials that are not (or not yet) actualised" (Waterton and Dittmer 2014:125) (Deleuze, 1991) which also manifests itself as the concept of the 'almost' (Thien, 2005) notions of the virtual are nonetheless very real (Adey, 2008) contributing to understandings about how control is achieved through affect. Reading regarding the virtual also leads to the particular kind of understanding about relations to death, the past, and trauma - a haunting way to consider how museums are themselves haunted with and by experience, which I experienced in a number of forms and means when engaging with archives, sites of commemoration or memorialisation, or the museum and its constituent galleries, all which lingered with the pervasive feeling of a haunting in progress. "Sometimes haunting can work to territorialize the assemblage, while under other circumstances it can be just the disruptive force to which postcolonial theorists aspire" (Waterton and Dittmer, 2014:126). Haunting, especially in the museums and spaces I explored, had a distinctly postcolonial context. In nearly all of the examples, an Imperial or Colonial power dynamic had been at play in order to create or sustain the material. It was an unexpected reflection that full came to me long after I had exited the premises, through a trace - which I will discuss later in my methodological approach - where I came to the realisation that so much of the early material regarding tear gas use is heavily managed or controlled by imperial or state actors who may have been instrumental in creating not only an Anglo-centric narrative but a less-than human one, focussing on objects and spatial representation.

Countering that thought would, I hoped, be a way to enliven my research, by focusing less on the objects themselves and their materiality or agency, but on what they had meant to the lived experience of those who collated or curated them, or were original witnesses and participants in their story. This would also be a way to re-conceptualise the museum and foreground the role of the human. At memory sites, researchers and research participants explore, understand and come to define such places using their own contextualisation of prior memories, thoughts and feelings, which could be innate, varied, or traumatic. Peoples experiences of a memory site are subjective. Expanding the availability of visual material allows for an enhanced capacity to bring new knowledge to the site, as the "material helps carry the experience

of the memory site forward into the future as people revisit and consider it" (Sumartojo, 2018:21).

That process of (re)visiting and (re)considering is deeply important to sites of memory which centre the experience of tear gas use. Just as the human body can become attuned to exposure to CS, anecdotally understood from the military personnel who are functionally immune, police officers who display lesser symptoms, or the frequently protesting individual who has a priori experience of tear gas and is able to resist it in a more conducive manner, the idea of repeated experience of the experience of tear gas use tells us that people can become attuned to the idea and slightly numbed to the traumatic nature of the experience. This all feeds into the difficulty of presenting experience through the materiality of the museum, mused on by Witcomb: "how can history museums play a role in developing a form of historical consciousness that encourages not only a critical engagement with history but also a sense that the traces the past has left on the present, matter?" (Witcomb, 2013:255). I engaged with the ever-present question about how the curation of the museum spaces which featured tear gas - as an exhibit or contextual reference point - told its story effectively or affectively throughout this project.

3.6 Vignettes and traces

I utilised vignettes throughout the empirical chapters, hoping to present them as more than just the "magical ethnographical moments" of Hitchings and Latham (2019:976) but as observations that were integral to the research, or added a different nuance to an observation that I had encountered by choice - marrying a vignette that either spoke to enhance or to counteract an observation being made was, for me, an approach that helped connect different methodological approaches with a unifying thread. The vignettes which I gained from conversations with friends and colleagues, who willingly and excitedly shared stories upon hearing of the development of this thesis was hugely influential. They allowed me another way into academic writing, which prioritised experience and sensory knowledge, and kept this thesis grounded in the unfiltered - and at times, alarming - by foregrounding the experience of people who have used, or had used upon them, what amounts to a chemical weapon. The vignettes offered by people whom I engaged with were often streaked with the 'black humour' or 'gallows humour' identified by Christopher (2015) which pervades how people in the emergency services or military interact, serving the purpose of actually

contributing to the resilience, health and wellbeing of persons exposed to traumatic events, and is featured often in closed communication circles - which I am lucky or privileged enough to be engaged in with regards to my positionality and work. That they were so aligned to the reflections of people who have been exposed to tear gas as protestors or demonstrators, or bystanders in the wrong place at the wrong time, was an interesting angle explored throughout the empirical chapters.

Presenting vignettes in line with Cadman's nonrepresentational theory (2009) and some of the alternative methods of sensory exploration outlined in Last's explanatory article on the experimental approach (2012) such as utilising them to produce a new side to previously static sources. I also drew inspiration from the way Sumartojo (2018), and Waterton and Dittmer (2014) teased small reflections from the memorial spaces they spent time in allowed for the demarcation and extraction of moments of ethnographic encounter, which became realised when reflected upon. At the core of my methodology approach was the mantra that meaning is produced, not discovered. I, as the researcher, am not the sole agent of meaning-making, and can glean meaning from multiple sources but intrinsically my reflections as a research method can be an additional mechanism by which meaning is garnered. I used vignettes and traces as an enhancement to my research notes and field workbooks, returning to them long after I had first made entries to highlight that which could stand by itself as a vignette - a highlighted gem of experience or understanding, or as a trace - a moment which had not presented itself with such clarity at the first pass, but crystallised into significance upon further introspection.

Traces are "brief, narrative, aphoristic speculations on a particular theme" (Allums, 2020:88) characterised by how interpretation of the trace may involve considering the interference, overlap and uncanny nature of the experience of research itself. "This approach is complementary to both a critical politics of the everyday and a broadly poststructural, postqualitative (St. Pierre and Jackson 2014; St. Pierre 2017) aversion to rationalist phenomenology. "Bloch's philosophy of traces is more particular than these, resting intentionally on the moments that give us pause, that call back to us, that call us back." (Allums, 2020:89) (Bloch, 2006). By postqualitative inquiry, they mean how the methodological instability that arises from critiques of knowledge based in the material, textual and ontological can lead to diffractive analysis and an opening of different points of view, concerned with conundrums such

as ‘what is data’, how do we make methods, how do we conceptualise and interpret space, time and materiality (and how do they mediate interpretation) which affords the opportunity to re-engage with my own methods, thinking diffractively: “instead of identifying differences from or between bodies to produce codes and categories, thinking diffractively is a process of interference and overlapping and studying the effects of what Deleuze would understand as positive differences.” (Taguchi, 2012:272) and utilising this approach to unfold previously unconsidered areas of research - either sources or analyses.

Allums uses traces to “trouble - and learn from” (2020:89) her own activities as a researcher, just as I applied an examination of traces to the reams of material I had created when engaged in the data collection and initial interpretations that constituted my earliest efforts in this thesis. “Time pressures and inexperience made the simple choices the correct ones, and everyday moments of latent significance went unanalyzed and untroubled, even as these same moments coalesced around dense nodes of empirical promise” (Allums, 2020:88).

Traces was by far the most lenient methodological approach to engaging with my ‘data’, the sites and scenes of tear gas commemoration. Over a six-year long project, there was much ‘volume’ to my observations including research notebooks, diaries, drawings, photos and videos, as well as moments of reading or researching that I categorised as ‘creative’ moments of themselves. The slower approach to this thesis, drawn out over six years, afforded a lot of ‘give’ in going back to pluck from the insignificant scribbles something which began to grow. I would describe it, somewhat euphemistically, as like the process of growing a pearl. My first research notebooks from visits to sites and scenes in the mid-2010s became grains of sand, that over time were glazed and built on to the point that they could emerge latterly as concepts, mechanisms of engagement, and little revealments to me. They would not have been pearls when first recorded, nor with the compactness of a full-time schedule, but when afforded the time they needed to sit, they could be built upon. “Bloch understood the trace as an important mode of philosophizing, emerging from the uncanny and strange moments of the everyday whereby an observant practitioner can glean insights into the fundamental relationality of life (e.g., to self, to others, to history).” (Allums, 2020:90).

The method Bloch wrote on, and Allums breathes air into, is inherently backward-looking, reflexive interpretation which sits on top of methodological praxis in order to enhance. “It is the power to thus transform uncanny, although otherwise unremarkable, moments and objects—from negligible curiosities of everyday life to powerful philosophical signposts and ultimately toward interpretation” (Allums, 2020:91). Listening (through rhythmanalysis (epistemic philosophy of the everyday) means the person “will listen to the world, and above all to what are disdainfully called noises, which are said without meaning, and to murmurs, full of meaning—and finally he will listen to silences.” (Lefebvre 2014:29). So “Lefebvre helps us to listen. Bloch helps us to pursue the strangeness in what we hear or what we do not” (Allums, 2020:94) and Allums helps us to be comfortable in continually pursuing being uncomfortable, stable in pursuing instability.

3.7 Methodological approach

In this section of the chapter I will talk about my study, the methodological approach I took, and what became my research question and aims. My study was primarily based on the utilisation of archives in order to reveal material and the subsequent analysis of those historical sources alongside other contemporary data points that I collected and analysed, with a reflexive ethnographic reflection of my encounters with the both the material and the spaces. Theories within cultural, political and feminist geographies influenced the method, although the method itself was not wholly determined or dependent on the theoretical background. I aimed to situate my thesis firmly as a contribution to qualitative research on memory and experience, through the explication of the violent and political geographies of tear gas use which are apparent through the re-telling of their use, in whatever form that may take. This research is an ethnographic exploration of themes within non-representational theory, linking atmospheres and memories with the primary source material which was encountered through the space of the archive, the museum and latterly by exploring digitised and digital sources of human experience, including narrations, poetry and artwork. Qualitative research can no longer be regarded as just the whims of one researcher - “anecdotal, not replicable, and not generalizable” (DeLyser *et al*. (eds) 2009:ii) but as a valid and rich way of opening up new areas of knowledge.

There were other conceptual methodological approaches that I considered as viable for undertaking the research. Firstly, and building on my Masters research,

considering the ‘networks’ of tear gas was an opportunity I explored. Methodologies which utilise and analyse networks increased in popularity and developed rapidly as a research focus in the 21st century, due to in part the technological power of mass processing and computing tools, as well as global trends such as decentralised management forcing more cooperative engagement than traditional hierarchies (Rozenblat and Melançon, 2013:V) as well as social networks, so it is natural for geographic research to have followed suit with this path. There have been significant contributions to the examination of the actors and networks of global tear gas proliferation, most notably Feigenbaum (2017) who charts the US-based companies who produce tear gas with a searing exposé of the users of tear gas, from the Bahraini military to the British police. Her work exposed the imperial and colonial power dynamics inherent in the proliferation of chemical weapons as well as policing ‘techniques’ which developed from racist and xenophobic concerns into authoritarian reinterpretation and reimagining of international laws.

Determining a methodological approach occurred in harmony with determining the research questions, the two pulling and pushing against each other in order to find a balance that was brought out and stabilised when determining that my thesis would be a largely ethnographic work, with mixed methodological approaches including the study of archives and objects, participant observation and auto ethnography in the museum space. I used DeLyser’s conceptualisation of the differences between qualitative and quantitative research as a mechanism to determine both where my deepest interests, and my strongest understanding lay, in order to proceed into a determination of the methodological design. She characterises quantitative research as being where “the scholar proceeds from a researcher-generated hypothesis to be tested” (DeLyser, 2008:234) into the data. This is not the opposite of qualitative research, and the differences persist not because one uses numerical data. Her definition of qualitative research, where the “research questions themselves are sought from the communities we study and work with” (2008:234) and issues are explored “on the ground, in the settings in which they arise” (2008:234) brings in the use of “a wide array of empirical materials” (2008:234) and aims to write about them richly and with descriptive accounts. I felt the strongest pull to this way of conceptualising my interest in tear gas, whilst also acknowledging that there was a push away from the quantitative at this point - I knew that there would be difficulty in accessing the precise data points, with accurate reporting of tear gas use across the

world nigh on impossible owing to a confluence of corporations and governments attempting to obfuscate the real extent of the proliferation of tear gas as a material mechanism of state control. There would be far too much investigative, and perhaps fruitless energy to be put into compiling a more advanced version of my Masters thesis - mapping tear gas use based on open-source reports found predominantly on Twitter. As a data source it bore some useful fruit but has limitations - access is frequently difficult in some of the more intensively authoritarian regimes (coincidentally those more likely to engage in frequent tear gassing - but correlation does not imply causation in this case) or in languages other than English.

As I detailed in the introduction, when it came to approaching the concept of tear gas, especially through contemporary literature which did not have an overwhelming medical or scientific foundation, I owe a great deal to Anna Feigenbaum's work, and the PhD thesis of Alex Mankoo which brought a greater clarity to scientific developments within the historical activity of British imperial interests. But methodologically and creatively I wanted to make a different contribution, which while acknowledging the significance of approaching tear gas from an understanding of power and politics. I wanted to also speak of the ordinary experience of individuals and situate the exploration of sources within non-state, organic creations such as art, poetry and photography. This influenced the determination of a methodological process which paid a great deal of attention to affect, as well as to non-conventional forms of representation.

I questioned whether anything could be learnt from seeing how gas use was recorded and represented. Some of my earliest explorations in the thesis has considered mapping - a wholly geographic visualisation of the distribution and frequency of tear gas use around the world, attempting to make spatial sense of the experience and also emplace tear gas within territorial geopolitics, contributing perhaps to debates within political, health or social geographies. I contemplated for a while before ultimately becoming dissatisfied with it, that in simply geo-locating or plotting tear gas use as if it was a mere data point did not allow for much exploration into the experience of that use of gas. Without expanding upon what the data points represented, and attempting to make sense of them, there was not a great deal to be learned. Yet reading further into the aftereffects of tear gas use brought further questions to the fore. Was it targeted or indiscriminate? Perhaps even accidental, and maybe the experience led to lessons

learned and policies changed. Was it planned, forethought, prepared for - part of a police escalation of violence? Who experienced it, and what did they think? How did they characterise the experience, and was that shared? I began to think deeper, probing the experiential nature of post-protest activity and examine what came next - when experience could be unpacked, understood and represented.

3.7.1 Sources

The initial data collection for this thesis spanned a four-month period during late 2017 / early 2018 to scour for examples of where tear gas use had been represented in a vast array of forms of media. Practical considerations underpinned my early speculative research design, as I explored where I would get sources from in order to begin to plot the 'how' - a mechanism to answer and satisfy the research question that I was refining during this time. It was during this time, engaged in 'searching' for what I had preconceived ideas would be a small, smattered sample of half-articulated memories or tales, that I was struck by the scale of tear gas use represented in art, poetry, objects, prose and other creative representations of human experience. I had expected to not find more than a few, disparate examples of where people had written (hence the early attachment to books as a source of experiential data) about tear gas use as an occidental part of their experience in a protest, but the depth and breadth of the 'data' was significant, and helped solidify that the methodological approach that I was developing would be suitable for a project of this size, expanding naturally into more diverse media forms.

Collecting the data that I intended to sort, order and analyse was a long process, spanning around twelve months. There were a number of mechanisms I used in order to carry out the initial trawl - to find sources of information that I could either progress, taking up and with me to form part of the story, or to discard for a number of reasons. The trawl - like the nets of the same name - was the widest possible method I could undertake in order to gather the nascent potential of relevant sources. I used search engines as well as social media, which themselves use algorithms that promote similar material to that which has been searched for and engaged with so after a while I was recommended material without it being searched for directly, especially on social sites like Twitter and Pinterest. The former has been studied in depth for its potential as both a data source and an assemblage, demonstrating the interconnectivity of protest (Tufekci, 2017) and how it can be mobilised to counteract the effects of extreme

governance by political or militarised forces through citizen-led social movements. The latter would not have necessarily topped my list of places I thought I would find relevant material on tear gas, were it not for a particular series of protest artworks that gained popularity and notoriety in the Umbrella Revolution in Hong Kong in 2014, and which became regularly recommended to me through social media algorithms recognising an interest in the subject and pushing further material into a number of platform's feeds, allowing for an exploration of linked and relevant sources of protest artwork.

The predominant mechanism I used to seek and capture data was via online searches utilising a multitude of slightly varying keywords and terms. There was an ease and convenience to locating material which was stored digitally and could be accessed at any time. Conventional office working hours likely mirror the opening hours of museums, archives and other spaces of memory or cultural sites like galleries. This presented a difficulty to access whilst also engaged in full-time employment, so I naturally relied on methods of accessing the material I was interested in digitally, or that which would be available centrally - ideally negating the need for extensive travel or time off. There is ease and convenience to locating material via online searches and digital searches, but there is a lack of tactileness as well. As Maller notes in her review of Qualitative research methods in human geography that even reading the digital edition can be a different method of engaging with an argument "I did miss flicking through paper pages and reading away from the screen" (2022:361) there is a difficulty to abandon the tangible and physical, especially if that has been the norm before or something which has become familiar and comfortable over time.

Once encountered, I acquired sources of data in that were retained in both digital and physical forms, from which to aid the process of examination and further categorisation. Sorting took place prior to coding. This was kept structured by an overarching 'source' spreadsheet on Microsoft Excel, noting not only the origins of the source (was it a painting, poem etc.) but where it was kept, who (if anyone or any organisation 'owned' it) and then where I had located my initial reflections on the material - as photographed, voice-recorded or typed, or sketched or handwritten field notes if I required a contingency that was not dependent on a smartphone as some places restricted my access to digital recording, prompting a return to 'scratchnotes' (Gorman, 2016).

Mind mapping as an organised brainstorming method (Michalko, 1998) ideally utilises both hemispheres of the brain with full capacity (Buzan and Buzan, 2006) to draw parallels, synthesis connections, and express concepts through visualisation. This attempted a constructivist approach to creating knowledge, utilising real-life experience to group and organise an information structure, with the motive of bringing forth a creative concept from analysis of the relationships between items. I sorted these sources through the creation of a mind map using Mindnode software, as below:

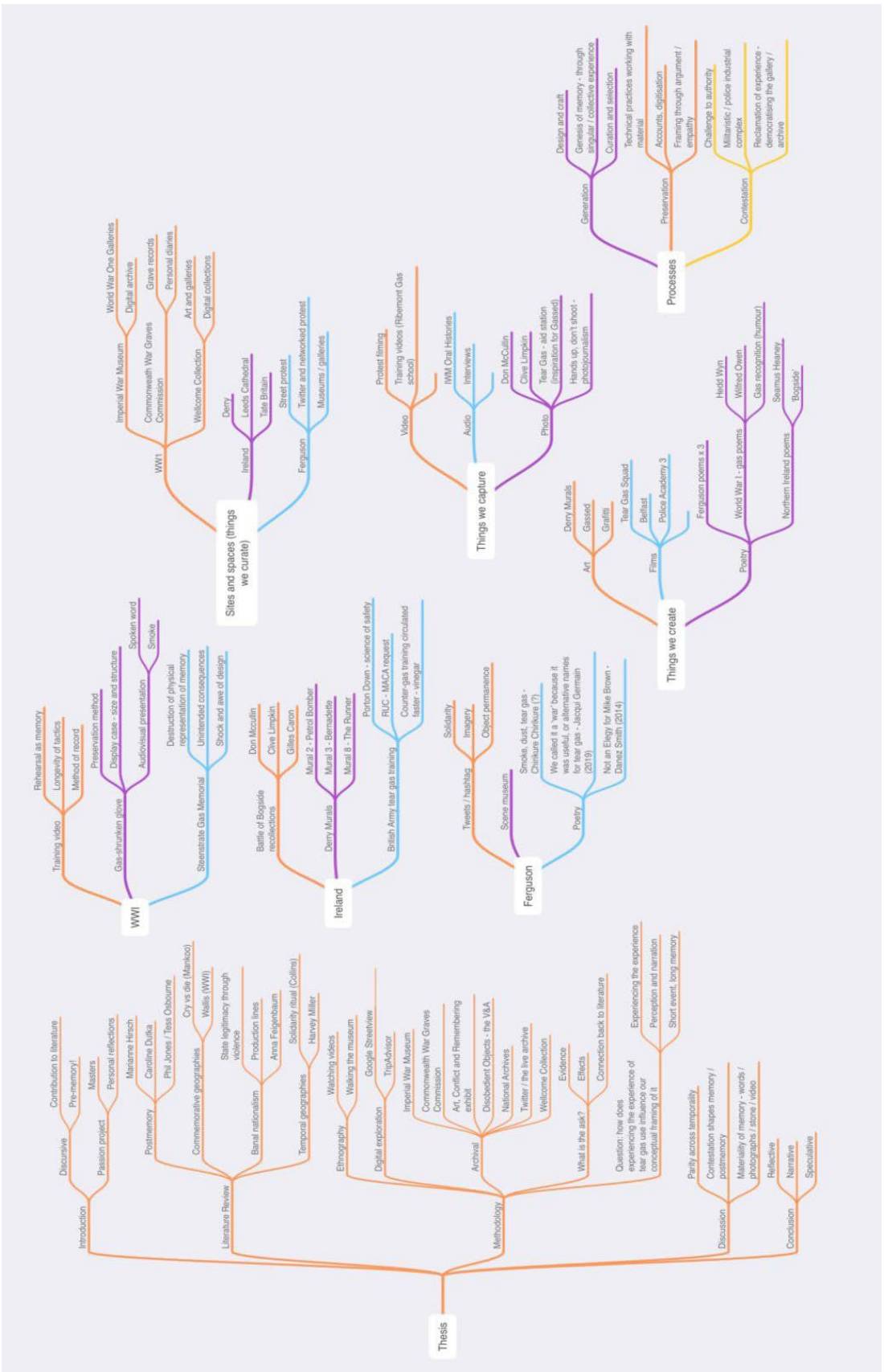

Image 3.1: Mindnode of thesis outline (Author, 2022)

There was an additional dimension, albeit the smallest sliver that could not in itself be termed a methodological approach, but an enrichment of the existing data that was provided to me through the conversations I had with friends, family and colleagues over the six years of writing the thesis. As I had determined that I would not carry out interviews, or attempt to amass a participant grouping of people who had experienced tear gas use in order to probe into their retelling, I did not canvas my colleagues for participation. However, they frequently offered it, through vignettes in conversation which spoke about their experiences with CS during policing or military service. These vignettes feature throughout the discussion, weaving the most minute traces of experience through my analysis of longer, more conventional, or quantifiable sources.

Finally, it all came together. There were six types of source that all three eras had in common, and that I could compare and contrast in order to weave an understanding of what a tear gas experience told me. These six areas of commonality showed that although there was diversity to the mechanisms of representing the experience of tear gas use, there was also consistency - and this was hugely interesting. I kept detailed research diaries, making handwritten reflections about my encounters with the objects and spaces I encountered. After viewing a piece of art or reading a poem for the first time, I made quick notes of my impressions, so as to be able to outline what the source showed or told, and how it would contribute to changing, aiding or otherwise enlivening my understanding of the representative experience of tear gas use.

These became the foundation for a more reflexive account of the object or space, whether because I revisited, or re-encountered it. These diaries have been transcribed, in part, to form part of the reflexive commentary on objects featured throughout the subsequent subject matter-based chapters. I also took photos and videos where I could (this was not permitted in some archives or spaces, and not an opportunity practicable when accessing material from digital archives or digital experiences) and have incorporated these throughout.

3.7.2 Research question

This section outlines the research question, drawing on which approaches from the research design were selected in order to become woven into the overarching

methods applied throughout the rest of this thesis. There was a concerted effort to align the methodological approach with a sustainable way of building connections between tear gas, memory and geographies of violence. I wanted to move through the questions with a logical approach, doing more and showing more like layers peeled away or revealed. Taking time to marry the research design with a suitable question and *vice versa* was a rollercoaster - bordered with time constraints and restrictive pathways that one or the other might erroneously send me on. The alignment of research question and research methods happened when I stepped back to consider what drives the places that I wanted to go to. The inevitability of engaging in certain spaces over others was also bounded by the restrictions of my time and funding, but it did not overly dictate the theme of the research question, which was always inherently fascinated with how perception, affect and postmemory influences the construction and curation of the remembrance of events.

The research question that this thesis aims to explore is centered around the ways in which audiences – from researchers to members of the public at large – can vicariously experience tear gas use. Firstly: what is the human experience of tear gas use, and secondly: what are the implications of that vicarious experience – for legacies of memory or memorialisation. Being able to quantify or qualify that vicarious experience, firstly, allowed for this research to move into considerations of its meanings. Exploring how the deployment of tear gas is coded, reinvented, reimagined, preserved or presented through its intermediation by a variety of sources – museums, artworks, poems and films, the intention is to assert what its use means to those who experience it. This project identifies and investigates where tear gas has been used, and then moves further into examining the ripples of after-effects of that use, and how it helps reinforce or redirect global conversations on the validity of tear gas as a riot control agent or a hallmark of state power and violence.

It was crucial to open up experiences of tear gas use by exploring their impact and legacy. How was the use of tear gas coded, reinvented, reimagined, preserved or presented, and what does that tell us? The key act that I examine is the vicarious experience - not an auto- ethnography of tear gas use as both the ethical and legal questions of exposing myself to tear gas were significant research obstacles, but how the deployment of tear gas is represented by those who experience it. For the people throughout the last 100 years, however, who have experienced tear gas use and

reflected on it, the act of exploring their experience through archival research and ethnographic traces, vignettes and interpretations of what they wrote, drew, or made following being subjected to tear gas was a rich and eminently achievable process, drawing together the research intent, design, methods and a valid enquiry, whilst having regard to ethics - I wasn't exposing myself or others to threat, risk or harm; or undertaking the collection and analysis of data that would be sensitive personally, politically or financially. I sought to explore and explain the experience of tear gas use from 1914 to 2022 through its memories and memories, seeking meaning from the sources which could tell authentically and utilising creative methods just what this chemical weapon did - and does - to human experience.

Central to the research were questions of the legitimacy of tear gas as a tool of policing, controlling, or otherwise affecting the human body, which were incorporated into secondary queries designed to bring forth tangible reflections of the vicarious experience of tear gas use. Regardless of whether this was a digital or physical source, epic poem or single photo, it helped to be able to consistently explore the same queries, namely:

1: What does the source show or tell about the human experience of tear gas use
2: What is the context of this source?
3: What could it mean about the vicarious experience of tear gas use?
4: How or why is this significant?

Through seeking to answer the research question, applying the research objectives, and utilising all research methodologies outlined in this chapter – though with a stronger emphasis on critical visual methodologies for the vast majority of sources collated – it is intended that this thesis deliberate and explore the impacts, legacies and human experience of tear gas use.

3.8 Encountering challenges and difficulties

Alighting on a methodological approach in order to enter and explore how tear gas plays a role in the creation and sustaining of memories of a place or space was a process I can only describe as being fraught with self-doubt. Did I want to follow the thing? Object geographies and the visualisation of networks, modelling geographical variations and producing networked hierarchies appealed when I first considered the

path of this research, but so did conceptualising volumes and working in geographies of space - thinking of Sloterdijk and Adey, with their bubbles, spheres and airs. Did I want to look at museums, curation and artful geographies? Well, obviously, because I had never been so wholly taken and transfixed by an object until sat in the semi-circular viewing area looking at a man's glove, rendered tiny by the pervasive particles of poison gas - but there was more. If objects existed that recorded gas use, surely there would be a record of how the people experienced gas use too?

Having ruminated on the intentions behind this project, I designed my research around the ability to carry out broad and deep engagement with three of the four main qualitative research strategies (being in the space, interviewing, observing, and gathering data) as articulated by Merriam and Tisdell (2015). Accepting at the first opportunity the limitation that I would not be able to interview in depth due to the constraints of my availability, but also due to needing to navigate issues of trauma in ethics, as well as accessing individuals who may not wish to speak openly about a difficult or dangerous event that they experienced.

Methodological approaches seldom pay explicit reference to the constraints or conditions that funding puts to progress or creativity regarding activity. Marcus, largely playing devils' advocate, posits that works which "point to practice" (Marcus, 2010:166) are the priority for engagement and "the descriptive space of ethnographies itself has not seemed an appropriate context for working through conceptual problems" (166) enrolling fears that the funding push to certain acceptable or desired types of methods would create a decline in ethnographical approaches in favour of those suited to defined questions and easily pre-determined processes. Certainly, the absence of a discrete and easily answerable question was a weight on my mind through research design, but ultimately outweighed by the desire to bring new light, new approaches and new questions to the subject. My engagement with this project has been entirely self-funded, and though initially somewhat of a concern, especially when balancing a full-time professional career around the requisite engagement in this study, it ultimately proved the right decision for me. There were no financial constraints regarding my methods, research questions, or interests, and the areas which I floated to (or buffeted between) when considering my entry into geographies of memory, violence, or representation were my own to take; albeit with a weather eye on the time commitment of engagement in a particular area.

It is furthermore relevant to the methodology section of this thesis that I make explicit reference to the concurrency of my research alongside a full-time career in emergency planning - a somewhat thanklessly demanding industry in the UK often described as a 'Cinderella service' - sweeping up the dirt from behind closed doors (Easthope, 2022). There has not been a "quiet" year since I commenced this in 2016, whether terrorist attacks, severe weather, Brexit preparations, large-scale events, Royal deaths or devastating pandemics. Developing complex methodological approaches, expanding my exploration to more sites or times or places, engaging with tens if not hundreds of additional resources, objects or stories was not a possibility within the constraints of my time for this thesis. Thus, it was remarkably easy to begin to carve out a methodology based upon the confluence of interest, capacity and capability. As perhaps not a natural reflector, it was after careful consideration that I developed a preference to work through my interests and questions utilising a combination of archival studies and ethnography - primarily vignettes and traces - as a mechanism to explore into my areas of focus, whilst also meeting the needs of the research intentions.

Museums are rich and complex spaces for the examination and practice of memory, mourning, and commemoration. Whilst the criticisms of the exclusivity and doctored agency of museums are valid, they have long been central to the production of narratives of state-building. Since the Covid-19 pandemic, however, the space of the museum is fundamentally changed. Notwithstanding the hangover of mandatory signage, plastering most available surfaces with explicit instructions on how, when, and why to wash your hands, museum spaces became altered by the imposition of other, unsigned restrictions. Queues took over, demarcating the available space that had allowed for freedom to move in patterns countering the design flow of spaces. The availability of food and drink options, as well as the space to partake of them, dwindled - making a space that once would have sated all senses over a longer period of time.

There are further challenges ahead too. The cost-of-living crisis incumbent on the United Kingdom - a confluence of the challenges arising from Covid-19, Brexit and the war in Ukraine - will no doubt have a devastating impact on public spaces designed to be open, lit, heated and accessible. The Lowry, a theatre and gallery complex in Salford, Manchester has been the first to stick their head above a narrative parapet to highlight that they are facing an energy bill of nearly £1 million - £860,000 and likely to rise (Pidd, 2022). With the astronomical cost just to keep the doors open,

this will likely have a paralysing effect on smaller museums and memorials who cannot afford the rates, although should have a transformative outcome on the digitisation of exhibits as museums scramble to keep the virtual collections accessible - potentially for a cost.

With reference to the Covid-19 pandemic, there is an emotional journey that occurs when reconciling the failures of 'Plan A' with what can be taken forward and utilised. It felt difficult to me that for the entirety of my available time to do research and data collection, the Coronavirus pandemic made travelling nearly impossible. However, Covid-19 also changed the nature of being in a space to experience it in a multitude of ways. Memorials and museums went unvisited, but institutions began to open digital doors. Undertaking digital 'visits' and engaging with the spaces of the museums or galleries during a period of such significant change allowed a valuable viewpoint to the thesis. Now, in the 'stabilisation' (Deeming, 2020) phase of the pandemic, with some doors reopening, there is a flourishing well of digitised sources and databases, in addition to greater considerations about the inclusivity of research methods to encapsulate less of a need to travel, spend money, or be face-to-face in order to promote the feeling of authenticity. Upon reflection, it may be that the pandemic represents a paradigm shift in research methodological approaches, and will in time prove to be beneficial in opening the seam of source material to digitised, freer enquiries.

3.9 Conclusion

To summarise, my methodological approach was varied, utilising archival and contemporaneous sources as well as exploring the spaces of commemoration ethnographically, maintaining extensive field notes utilising multiple mediums including vignettes of prose, photography, and videography in order to build an intricately connected picture of how tear gas use was experienced by those who were subjected to it. The span of mediums where recollections were made and perspectives were represented was broad, taking into account the artistic, auto-ethnographic or ethnographic, especially those presented in film or video, including documentary features which were an excellent source of reflection by participants about tear gas use or exposure. Once recollections had been found, ordered and sorted, they were critically analysed in order to develop the narrative found throughout the subsequent

chapters of this thesis. This methodological approach, on reflection, served the needs of the thesis well, allowing me the opportunity to weave together sources with vignettes and traces, and construct reflective, post-qualitative analysis on how the ways and means by which tear gas use was recorded and commemorated constituted comment and lessons on what it meant to the people it was used upon, as well as what we can learn from this.

4 Things we curate: monuments, museums and spaces of memory

"That 'tis in vaine to dew, or mollify / It is with thy tears, or sweat, or blood"
(Donne, 1611)

"It had been a war of kingly poisons, in the air, in the memory, in the blood" (Berry, 2007)

4.1 Introduction

This chapter deals with the examples of representative experience of tear gas use that have been found in museums and monuments where tear gas use is displayed and detailed in exhibits or narratives, and other spaces or sites of memory where tear gas deployments have occurred. It pulls together a multitude of encounters with everything from state-funded and state-shaped museums such as the Imperial War Museums in multiple locations across the UK to the spontaneous creations of artists including disruptive protest collectives.

As explored through the literature review, sites of commemoration are integral to the production of postmemory, and their continued creation and (re)imagination influences "how that "sense of living connection" can be, and is being, maintained and perpetuated even as the generation of survivors leaves our midst" (Hirsch, 2008:104). Scholars of museum- or memory geographies pay attention to affective atmospheres, which become core to "the sensory leisure experience" (Steinbeck and Munar, 2023:1) and explore how these can be utilised and harnessed, contributing to how the "affective forces congeal around particular objects and bodies and echo as part of an assemblage" (Closs-Stephens, 2016:182).

This chapter journeys through a number of different sites, comparing and juxtaposing the experiences of tear gas use which are contained within their specific holdings, whilst I begin to offer a perspective on how affective atmospheres can be harnessed in order to perpetuate an experience of the experience. The sites visited and incorporated into this chapter are dynamic spaces of memory, constructed and maintained according to a plethora of parameters, which shape how the tales of tear gas use become revealed to those who encounter them. They are also subject to memory construction and (re)imagination, which may contribute to a feeling of force - forced perspectives, forced memories and forced conclusions persist when the

experience is perverted in order to highlight or emphasis one particular perspective where another is reduced or dismissed. Using sensory ethnography to explore the spaces, coupled with digital imagery and vignettes to extract certain key aspects to present throughout the chapter as evidence of experience, this first empirical chapter both emplaces and displaces the experience of tear gas use, asking 'what does it tell us and what can we learn from this?' - aligning with the research questions which are outlined in the previous chapter. Experiencing the museum space allowed me to gain an insight into what tear gas recollections wanted to tell, their tales presented through the methods of curation and organisation in the context of the wider gallery as well as the museum itself.

4.1.1 Data sources in this chapter

The table below presents all of the sources which have been utilised to form this chapter, categorised and sorted according to their type and era:

Source	Era	Type	Location
The Gas Shrunken Glove	World War I	Exhibit (physical)	Imperial War Museum - Lambeth
Tear Gas grenade	World War I	Exhibit (digital)	Imperial War Museum - Lambeth
Tear Gas grenade launcher	World War I	Exhibit (digital)	Imperial War Museum - Lambeth
Gas Hood	World War I	Exhibit (digital)	Imperial War Museum - Lambeth
Gas cross	World War I	Postcard	Commonwealth War Graves Commission - Maidenhead
Steenstraete Monument	World War I	Postcard	Commonwealth War Graves Commission - Maidenhead
Airborne Assault Museum	The Troubles	Exhibit (physical)	Imperial War Museum - Duxford
The Free Derry Museum	The Troubles	Museum	Derry, Northern Ireland
Disobedient Objects	1970s-present	Exhibit (physical)	Victoria and Albert Museum

Table 4.1: list of sources for chapter 4

Representing the sources in a way which felt authentic and allowed for the core of the exhibit or encounter to be imparted was important. I therefore have utilised both photography and videography in this chapter. Some of the embedded sources will play a short video clip - designed to accurately reflect the motion encountered in one of the exhibitions, which is a key curatorial decision that influences the experience of affective atmospheres. The ability to determine meaning aligned to the research questions, however, will not be dependent on being able to see motion in what is contained within this chapter as each source will be fully described.

Some of the museums or places of memory were physically visited during this thesis, though others - due to the prevailing conditions of the Covid-19 pandemic - were engaged with only virtually. Across these curated collections, from the largest and most deliberate assemblage to the most tangential reference to tear gas use, there is a rich seam of detail in the data which can be found across such sites, telling me about how and why the use of tear gas is remembered and represented in the multitude of ways in which it is found.

4.2 Sites and spaces of memory

Where do we go to, when we want to remember? Sites of memory are often specifically founded and demarcated to serve this central purpose, through their directed design which contains (situates) and delivers (promotes) an affective atmosphere to influence the understanding or reimagining of a particular spatial, temporal, or social identity. In a number of the examples which I discuss in this chapter, national identity, nationality, and nationalism are concepts which influence the creation or sustaining of sites of memory, for reasons embroiled in how memory is produced and presented.

Those power relations have influence over the museum in two core matters: firstly, in how it contains material - through the specific addition or exclusion of objects, perspectives, and the design choices which link material to memory (lighting, sound, textiles and information are all influential mechanisms in the situating of the experience) and then secondly in how it expresses meaning. “The museum is regarded here as a site where feelings about others as “others” materialise in a particular geometry of power relations” (Tolia-Kelly, 2016:897) Those feelings - positive or

negative - are embroiled with affect and engaged with frequently at the museum by a range of different scholars. Technological explication brings an affective presence to the museums written on by Boehner *et al*., (2005) though is in danger of being the object of focus itself, foregrounded by attempts to make every interaction in the museum space digital and thus remove or otherwise alter the primary focus of visitors (Isaac, 2008). In spaces of heritage including the museum, affect works to produce or consolidate national identity by incorporating aesthetics that strengthen the sense of a nation, as observed by Mookherjee (2011) or emphasise concepts of nationalism such as the 'imagined community' of Anderson's (2005) work on how we see ourselves as a collective enhanced through shared and constructed behaviours and identifiers. Waterton and Dittmer (2014) encounter affect where it facilitates an understanding of the traumatic events encapsulated in a space of historical recall - a monument, more mausoleum than museum. Where tear gas use is present in exhibitions or artefacts the overall effect touches further on Waterton and Dittmer's impressions of the mausoleum space; it has an overall effect of puncturing the mood, stifling the air around the exhibit as if still pungent and cloying.

Museums present a form of mediated memory, where the "collaborative, practiced, productive aspects of remembering that can emerge from the use of diverse media" (Dijck, 2007:342) work in harmony with the material memories where "embodiment and mobility harmonise the local, distant, past and present (Schine, 2010) to yield material memories" (Stevenson, 2014:343). I was interested at how these mediated memories would present through the material of the museum or memorial, where objects that are on display allow us to experience the use of tear gas indirectly, through the partition of crafted and curated control. Further to that, the spaces of the museum or site of memory allowed for a novel exploration of how the use of tear gas could be presented - by thinking about what tear gas constitutes as an exhibit-able object, and what else it is enhanced by: particular when it came to artwork, material design of the exhibits or accompanying soundscapes. Clearly there are functional, practical, logistical issues to bringing to bear a chemical weapon in a museum or memorial space, so any exhibits which speak to the effects of tear gas use are already doing it in a second-order manner, once removed from the physiological gaseous experience by time, and attempting to convey an atmosphere through the examination of the material of tear gas use in itself - empty canisters, shipping orders, protest artwork, counter-gas personal protective equipment and so on.

4.3 The Imperial War Museums

So where did I go to, when I wanted to see remembrance? Starting my exploration of the experience of gas use where it all began, with the advent of chemical warfare in the First World War, took me from the Imperial War Museum to the Commonwealth War Graves Commission, from London to Maidenhead by way of the battlefields of northern France and Belgium, in my exploration of what persisted in places so preternaturally affected by the use of gases in warfare. Whilst, as detailed in the introductory chapter, tear gases had been in development primarily by the French in the first decade of the 20th Century, it was during WWI that they came to prominence through use by both German and Allied powers.

As I explored those archives, I was always a little aware of the idiosyncrasies - or issues - of my position in them, and their position in society in 2020. The nature of even the names - Imperial and Commonwealth - speaks to a particular intersection of power, politics and patriarchy which I was keen to explore, whilst always challenging the significance that state-based structures would put to the recollection and preservation of some materials perhaps over others. As Alan Borg, a former director of the IWM lamented, “I run an institution with the worst three words in the English language… Imperial, war and museum”. (Borg, 1998, quoted in Tait, 2015) This challenge was commented on by Diane Lees as she began her tenure as director (Moss, 2014). As new galleries have been added, and previous collections reworked and revitalised, it is clear to see that there is some active thought being placed upon the reimagination what the IWM is and does.

My visits to the Imperial War Museum and Commonwealth War Graves Commission form the bulk of the data collection, in which it was difficult to navigate the relationships that the experience of foreign combatants have to the historical data which has been created and amalgamated within an imperialist space concerning the British and Commonwealth bodies of experience. Whilst the preservation and display of some artefacts is public - for a viewing audience - there is supporting detail, methodology, and historical context which lies privately, at request only, which has resisted attempts to democratise it. Throughout this chapter I will be asking the objects how they have come to being in the state in which I found them, and what these

journeys do to my understanding of tear gas use around 100 years ago, from which present-day implications can also be drawn.

4.3.1 The World War I Galleries

The Imperial War Museum is a collection of galleries located throughout the UK, with sites in London, Cambridgeshire, Liverpool and Glasgow, and where the museum spaces contain and display material from conflicts which have involved the participation of Imperial forces - enrolling a collective commonwealth of memory and mourning that sits inelegantly atop layers of telling and retelling the role of Great Britain and its place within global wars. The IWM was founded on 5 March 1917 when the War Cabinet approved a proposal by Sir Alfred Mond MP for the creation of a national war museum to record the events still taking place during the Great War. The intention was to collect and display material as a record of everyone's experiences during that war - civilian and military - and to commemorate the sacrifices of all sections of society. The interest taken by Dominion governments led to the renaming of the National War Museum to Imperial War Museum later in 1917. It was formally established by Act of Parliament in 1920 and a governing Board of Trustees appointed. Continuing its collections as Britain moved through periods of no war, Cold War, and modern war; the IWM has now established permanent collections for every major conflict of the 20th and 21st Centuries, and is now investing heavily in digitising collections, enabling access to material in their archives as well as on permanent or semi-permanent display. There is also work to make the museums more accessible with interactive events.

There are three primary places that I sought to engage with the Imperial War Museum as a collective, though with disparate parts, in order to examine how tear gas was represented in the museum space. In Lambeth, South London, the IWM London contains the World War I Galleries and the bulk of the archival material held by the organisation which is available for booked access subject to research permissions. It was here, in this airy and vast building, that I encountered tear gas artefacts predominantly from World War I, navigating the labyrinthine World War One galleries. With a greater emphasis on the theme of air warfare, and differing investment structures, the Imperial War Museum Duxford at RAF Duxford, Cambridgeshire contains mostly aviation-related exhibitions, though a small space is

given over to the Museum of the Parachute Regiment, where I encountered tear gas artefacts from deployments of the British Army to Northern Ireland. Finally, the Imperial War Museum's main website contains a vast digitised collection, including photos, videos and the audio of the IWM's interview-based Oral Histories series.

Of all the monuments, museums and spaces of memory, I spent the most time throughout this thesis in the Imperial War Museum in Lambeth, London. The World War I Galleries in particular, stretching throughout the ground floor of the expansive building, were central and integral to my formulation of research questions and earliest data gathering. Different exhibitions caught my eye on different visits, where the chance to observe others also visiting and meandering around the exhibitions at a similar cadence to that which I found myself undertaking allowed for an element of participant observation that enriched my narrative retellings and reflexive ethnography. Overall, the Imperial War Museums presented tear gas use as a thread linking a number of separate exhibits, common in a variety of different displays of varying prominence throughout their extensive collections. Through engaging with the exhibits on multiple occasions, and utilising a sensory auto-ethnography to experience the experience of gas as represented by the IWM, I will set out what was gleaned from these encounters.

4.3.2 Gas and Being Gassed at the IWM

Whilst I had been intending to focus solely on the 'gas shrunken glove', an exhibit composed of the singular object dating back to 1917, framed gently in a bell jar situated on a pedestal swirling with a looped multi-media account of gas use, I discovered that the IWM possessed a multitude of tear gas related objects, ranging in origin from 1914 to the present day.

The first object which came to prominence when searching their archive for its tear gas artefacts was the British First World War gas grenade, designed to be fired from a Spring-Gun or thrown by hand was preserved, and provided a glimpse into the weaponisation of 'tears', explored early in WWI as a tactic to distract, defocus and ultimately overcome an enemy in close proximity. The Grenade, depending on its markings, may have a filling of 'KJ' (Stannic Chloride), 'KSK' (100% Ethyl Iodoacetate), ' SK' (75% Ethyl Iodoacetate and 25% alcohol), or 'MSK'

(Methyliodoacetate). The chemicals by themselves, encased within the steel casing that became a hallmark of close quarter battle, were inoffensive enough, but when activated with a small explosive charge, would aerosolise and be dispersed onto the hands, face, or any exposed skin, and cause near-immediate tearing effects, attacking the lacrymatory nerves, irritating the eyes and respiratory tract and causing instantaneous coughing, crying, and non-voluntary mucus production. The effect that mass use of tear gas grenades could have on a non-protected enemy unit were significant, weakling its capacity to make and while the grenades were official introduced into service in February 1917 and not declared obsolete until January 1931, showing the longevity of a simplistic tool of tear-making.

Image 4.1: Grenade, Spring-Gun or Hand, no 28 Mk II Chemical © IWM MUN 3203

It did not take long after the gas grenades were withdrawn from service for suitable replacements to be developed - though more powerful and mobile. In an arms

race for control of riotous assemblies or civilian populations alike, grenade launchers and ancillaries were developed, archived in the IWM though associated with a different conflict.

Image 4.2: FM Gas gun (grenade launcher) © IWM FIR 9443

This example of a grenade launcher is of Argentinian design and utilised during the Falklands War. Whilst the design and manufacturing of the weapon begin in 1945, it was in continuous use well into the late 20th Century - again charting that a familiar tactic was utilised through every conflict in the 20th Century. As soon as mankind had discovered that chemicals brought the capacity to affect each other - to cause the body to seize, choke and tear - it seemed like a foregone conclusion that it would feature in all conflicts, from domestic to international.

I was intrigued at the parallels between these two exhibits - single entities yet

emblematic of the development of mass production capacity centered around the dispersal of aggravating gases. Their preservation in the IWM archives was interesting to me - part of a chronological study of the ways by which weapons were developed through continuous innovation to do more harm, whilst still being of ‘non-lethality’, or under the legitimising banner of ‘riot control’ aids.

As the tear gas weaponry developed, so did defences against it. Whilst rudimentary fabric face coverings were the archetype of all personal protective equipment now in use today, the early utilisation of other materials such as celluloid, rubber, and charcoal show further developments to the issue of combating gas effects, reducing their impact or mitigating their threat.

Image 4.3: PH ‘Tube’ Helmet, Anti Gas © IWM EQU 3812

Early accounts sometimes saw soldiers soak scarves or other material in urine - a primitive protective measure that was no match for chlorine or phosgene as they become commonplace, and still saw "all these poor chaps laying on the Menin Road, gasping for breath" (Newman, quoted in Chester, 2014) in the end. Tasked by Lord Kitchener after the gas attacks at Ypres in 1915, John Scott Haldane developed the first veil respirators, with mostly little success - as they proved unwieldy and with a short shelf life. But the crude coverings had some effect against weaker war gases or tear gas, and respirators such as the above began to be produced at amazing speed. Despite fervent attempts to issue troops with protective equipment that might counteract the symptoms of a gas attack - from tear gas frequently used in trench clearances to chlorine and phosgene, later mustard, which became hallmarks of large, planned offensives - the success rate of this equipment was low.

I had the opportunity to try on a gas hood, similar to the PH 'Tube' helmet. Attending a lecture series hosted by the National Army Museum, I met with Peter Doyle, the author of The First World War in 100 Objects, and we discussed object #51, a gas helmet from Loos. During conversation, where we spoke of research interests, he remarked that he had a replica of the hood made. *Of course I would like to try it on!* The experience brought me closer to a feeling of empathy and understanding for what it must have felt like, hot and claustrophobic under early gas personal protective equipment (PPE). No wonder soldiers, aggravated and fearful from hours of wearing protection triggered by the first appearance of tear gases in their immediate atmosphere, would seek to remove their mask for respite. The enemy tactic of utilising tear gases as a precursor attack would destabilise the resolve and moral of nearly anyone - if I was panting and disorientated after mere minutes deprived of air. "Tear gas munitions were therefore the first agents of chemical warfare to be used in World War I, and they subsequently played a significant role in the war. An important tactic in the fighting was to force the opposing army to wear gas marks as much as possible, since it was learned that solders lost much of their efficiency after wearing these uncomfortable masks for any extended period of time." (Jones, 1978:152) Feeling uncomfortable, they would remove their protection, and become vulnerable in an atmosphere which would then be exploited with the deployment of poison gas. As Doyle wrote "the soldiers became frustrated with the clammy bags and removed them, only to become casualties" (Doyle, 2016:181).

4.3.3 The Gas-Shrunken Glove

Having utilised the archive to explore a number of pieces linked to gas use in World War I, I selected a particular exhibit that I was drawn to. Arranging access to the material and requesting a space to view and engage with it was conducted online, by short and simple forms that were completed in advance and on multiple occasions. I took the opportunity to combine those visits with experiencing the galleries as open to the public in order to reflect on a number of items, including their public-facing material, and to allow myself to experience it as consumer as well as critical eye.

Image 4.4: Leather glove, shrunken by gas exposure © IWM EPH 4377

Rising above the circular pedestal that forms its presentation dias, trapped under the magnification of a bell jar that isolates and protects it from the swirling atmosphere of visitors eddying around the semicircular benches is the Gas-Shrunken Glove. “The damage to human bodies was reflected in what happened to this British Officer’s glove. In 1948, it was sent to the Imperial War Museum with the explanation that, although once full-sized, it had “shrunk to the size of a child’s hand” and become “quite solid to the touch” through exposure to gas during the war. Petrified and wizened, the glove chillingly shows how gas corrupted and deformed everything it touched.” (Hughes-Wilson, 2010).

Whilst the seeming fragility of the form of the gas shrunken glove is enhanced by its encasement in a glass jar, which evoked a tiny moment of humour as my initial reaction was to think of the dying rose of Disney’s Beauty and the Beast (1991) - the exhibit itself does not seem fragile but grounded and deliberate, carving out a space which feels securing and cocooning from which to sit a while and fully appreciate the presentation of the object with all that the exhibition brings to life. In an interview with Sophie Collard of Travel Darkly when the World War I Galleries reopened in 2014 after significant refurbishments, the Head of Content for IWM was asked about the design of the reflecting space - enclave, bench and table surrounding the gas-shrunken glove. She states that “The single objects under glass are powerful, the glove that has been shrunk by poison gas stays with you.” (Collard, 2014) and was answered by James Taylor “Yes, one of the things we wanted to do was to give the exhibits some space – these reflection spaces achieve that really well. Small objects can say as much as big. Just imagine what poison gas can do to your lungs if that’s what it does to a glove” (Taylor quoted by Collard, 2014).

The table beneath it sways with the movement of light-coloured clouds which swirl, travelling across its surface to reveal or conceal at varying points quotations from individuals regarding gas use, speaking also aloud of the perceptions of the use of tear gas and other war gases. The whole exhibit is a circle, with a low bench wrapped around it like an amphitheatre, where you can sit a while and observe cycle after cycle of the narration and the wispy figures which bring life to the object in question.

The figures on the table, running with bayonets drawn in a permanent final push that ends in clouds rising heavenwards; perhaps symbolising the fatal nature of

gas use. The display comprises factual background and contemporary opinions extracted from letters and accounts of soldiers in France and Belgium, which reverberate around the quiet space of the exhibit, and loop endlessly. Collective national remembrance events feature silence as well as sounds, as do exhibitions and presentations. Paying attention to the sounds, as well as the images and texts, makes a richer understanding of how commemorative spaces are constructed and experienced, in particular the weight of the silence which signifies another loop of the exhibition.

Image 4.5: Gas Shrunken Glove exhibition space (Turner, 2016)

The loop seems to begin with a segment from the Hague Convention - having observed cycle after cycle there is the largest pause and a resettling of the imagery before this part. I drew this conclusion; there is no transcript to guide a determination of where the circle begins and ends, but it feels logical and deliberate to begin with the legislative underpinning of gas use in war, setting the scene of what legal frameworks ruptured in order to lead to the circumstances later portrayed in the exhibit. It tells us that what is to follow is explicitly forbidden, and sets the tone for reflecting on what follows being an aberration of international law as well as human behaviour.

It is possible to chart a route through the quotations from the factual to the subjective, with the legal foundations giving way to the experience of gas use and the affective atmospheres it created and sustained. The first audiological segment of the exhibition displays: “it is especially prohibited to employ poison or poison arms... the contracting powers agree to abstain from the use of projectiles, the object of which is the diffusion of asphyxiating or deleterious gases” (IWM London, 2016) which is a reference to the 1907 Hague Convention. It moves on to set out the testimony of British officials: “The enemy employed vast quantities of poisonous gases in defiance of the regulations” (IWM London, 2016) again highlighting the legal context of tear gas, and other war gases, being utilised to gain strategic advantage. ‘Defiance’ is an evocative word, telling us that active decision-making has abandoned the rule of law. An unnamed soldier shares their opinion for the third quote: Gas was repugnant to me from the very start” (IWM London 2016) echoing the perceptions of gas warfare which spread from the front lines to the Home Front: gas was a horror; the ‘frightfulness’ and its use in warfare was viewed as morally reprehensible. However, British forces, responding to the precedent set by French and German units, became as complicit as they too took up the mantle of gas warfare. The air-quakes of Sloterdijk were referenced in the fourth quote “Whether we throw a few shells which spread death in the air” (IWM London, 2016) alluding to the use of chemical weapons constituted air-conditioning. The exhibit fades into the next segment, personal testimony from another unnamed soldier “When I did get my sleepy eyes opened and my senses aroused I noticed a peculiar white vapour floating about and each successive breath I drew—” (IWM London, 2016) which is violently curtailed, as if signifying that the last breath had been taken. Finally, clouds swirl into the last quote, referencing the power of gas that they were exposed to: “This gas was so strong that it turned all our buttons olive

green, stopped our wrist watches and turned the rats out of their holes by the score" (IWM London, 2016).

Tear gas use is given more potency by the process of remembering how its use was experienced, owing to the arrangement - indeed, the juxtaposition of two core facts about tear gas: it is, in principle, a non-lethal weapon - designed to be non-fatal and therefore less lethal than bullets and blades, and yet it is remembered with similar significance in the Imperial War Museum where a lengthy gas section has to be passed through before reaching detail about the new strange and unusual projectiles which were developed to cause new horrors in WWI. The strange framing of tear gas in archives featuring other weapons does not, as perhaps first assumed, serve to give it comparative weakness, but to highlight just how close in its development it came to being fatally significant to those who experienced its use in WWI.

The gas-shrunken glove is a representation of the peculiar atmospheres of commemorating gas use in WWI. That such a small object is given as much space, and prominently featured in the tale of the effects of the whole war - on Western Front and Home Front, shows the significance of the use of tear gases and war gases on the effect of remembering such horrors. They are brought to the fore through the design of spaces of memory such as those I have journeyed to in the IWM London, and gain significance as the years pass, rather than lose it. At the centenary of the conflict, the WWI Galleries reopened, with a remodel attempting to revitalise "how that 'sense of living connection' can be, and is being, maintained and perpetuated even as the generation of survivors leaves our midst" (Hirsch, 2018:104) which is encapsulated in the presentation of 'cultural memory' (Assmann, 1997) such as that which is institutionalised through the creation of archives or commemoration like the effects of gas on an officer's glove, from over a hundred years ago.

The sights, sounds and smells of the museum space generate an affective atmosphere which allows us to appreciate the material which is being displayed. As it has been asserted that "rarely are the experiences of museum visitors a focus of interest" (Kirchberg and Trundle, 2012:436) I paid particular attention to the overall 'feeling 'of being in the museum and what seeing tear gas-related exhibits presented for me to reflect on, emotionally as well as contextually for this research project. Sites which sought to provide the space and opportunity to reflect on tear gas use through their

museum design, such as the IWM World War I Galleries, contributed to a more engaging, slower, more reflective experience. That being said, even the temperatures allowed for a more pleasant experience air-conditioning may be a temporary relief to prevailing climates outside the gallery but also subconsciously reminiscent of the other meaning of 'air-conditioning '(Sloterdijk, 2009) as a means of committing a violent and all-pervasive atmosphere. "We may conclude that the bulk of museum studies literature concerns cultural, historical, or critical analyses of the museum as an institution: its societal role, its politics and management issues, its function as a place for learning, leisure, and self- actualization, and its curatorial and collecting issues. Rarely are the experiences of museum visitors a focus of interest.

The Imperial War Museum situated mediated memory in the form of exhibitions and exhibited objects, as well as providing access to an extensive archive of objects which also spoke about the experience of gas use in WWI. Having spent time appreciating the depth and breadth of the archive at the IWM, accessing material online and in Lambeth, and spending - over five separate visits - more than ten hours navigating the WWI galleries, contemplating the exhibits of significance and observing reactions from members of the public who were transient in the space at the same time as myself, I came to value the quiet atmosphere which has been created, from which to extend considerations of postmemory back a hundred years and attempt to draw reflections on what the user tear gas would have meant to combatants, and what that told us about its characteristics. The same was true of the Commonwealth War Graves Commission's entrance space and small museum, with vignettes of the individual stories contained within their archives, largely centered around the categorisation and collation of casualty lists and cemetery design, though the sources I examined spoke far more specifically about the trauma of gas use in warfare.

4.4 The Commonwealth War Graves Commission

This next section of my exploration of sites of memory and mourning, and the monuments created to tear gas use takes in a significant archive, which was engaged with both physically and digitally. The Commonwealth War Graves Commission (CWGC) was born out of the Imperial War Graves Commission, an early non-military endeavour to ensure that all fatalities of commonwealth nations who fell in combat, from were buried in fitting graves. Sir Fabian Ware founded the early Red Cross effort to record and care for all graves of British war dead as it became apparent that

repatriations would not be possible. It was Christian and charitable in its first iterations, but soon fell under guiding military principles, becoming the Graves Registration Commission, and making all-encompassing decisions, especially concerning the non-repatriation of all bodies - a political and military state that necessitated co-ordination of ad-hoc grave sites from five years of conflict into formalised graveyards to retain nationalistic and paternalistic tendencies through ongoing maintenance.

The organisation received a Royal Charter in 1917, and sought to embody and embed four principles which remain to this day. First, that "each of the Commonwealth dead should be commemorated by name on a headstone or memorial" …then that "Headstones and memorials should be permanent" … "Headstones should be uniform" … and finally, that "There should be equality of treatment for the war dead irrespective or rank or religion" (CWGC, 2023). These guiding concepts have significant influence on the material which I sought to access, which would examine the circumstances of death and injury for combatants in World War I, as well as the contextual experience of gas use, how early acts of commemorating took place, and the role of the Commission in creating and sustaining the archive that exists today.

Today the Commonwealth War Graves Commission are responsible for over 23,000 burial sites (including over 2,500 specific war graves cemeteries which were constructed by the Commission itself), and some 2,000 memorials in 153 countries around the world, governed by the pursuance of the original guiding concepts codified in the Commission charter.

Having spent a relatively significant amount of time in CWGC cemeteries in Western Europe already - both due to field trips with university cohorts, the Army Cadets, and a personal, familial interest in connecting with the spaces where my ancestors remains now resided, I was familiar with the ethos of the Commission, and could easily identify the markers of their spaces. The customary consistency of the architecture utilising Portland stone, and a calm but controlled horticultural design had been features of numerous excursions, especially in Northern France and Belgium, and I felt an affinity for the principles it embodied.

When considering where I would be best suited to explore data sources regarding the processes involved with conserving, commemorating and presenting the

experience of tear gas use, it was a logical and simple step to make some early searches of the CWGC website and their public-facing databases. I was able to quickly determine that the CWGC would hold records pertaining to gas casualties as well as information about early memorial processes; as they designated three chief designers for memorials as well as Sir Rudyard Kipling in charge of inscriptions shortly after receiving the Royal Charter and consolidating efforts after the armistice. These records, I hoped, would show the processes and practices involved in remembering and commemorating gas casualties, so I made requests in advance to the archive in order for them to be accessed and ready. This was done through booking a reading room and travelling to Maidenhead, to the headquarters of the Commission where the bulk of the archives are stored and maintained. It was a seamless process that was made efficient by the archive requests taking place online, and I did not feel that there was any attempt to gatekeep or prevent research from taking place - the only constrains were regarding arranging travel to Maidenhead.

As I arrived at the archive there was an observable effort behind how the CWGC had engaged in displaying their own history; from cases containing artefacts in the main reception, an array of reading material, and the logo mounted, projected, and placed at every possible point. There was a tangible connection between the building in which archive was set, situated in leafy grounds, and same design principles the CWGC has incorporated and embodied in their facilities across over 150 countries worldwide. The archive reading room itself was very well lit, with a large table to work from with a view of the courtyard shaded in dappled light outside.

I was invigilated and subject to code of conduct when engaging with the material, which was unsurprising. With certain records being over a century old, taking care to avoid water or ink contaminating them was essential. There was no requirement to wear gloves or to navigate any more technical viewing material, and my supervisor was knowledgeable and engaging. She took the opportunity to gather other potential pieces of interest on a similar theme to the material I had requested (gas-related casualty detail, memorials and artefacts relating to gas use) which expanded my sources by another three boxes worth of paper, and we chatted throughout.

4.4.1 Steenstraete Gas Memorial, Belgium

In a box at the Commonwealth War Graves Commission (formerly the Imperial

War Graves Commission) archives at their headquarters in Maidenhead, lay personal photos and clippings related to Prince Maurice of Battenburg; and a tale of how to remember, even when the evidence is destroyed. On a Commissioner's travels through France and Belgium, ostensibly to visit cemeteries and other sites of memorialisation, including the grave site of Battenburg, they collected postcards and other paraphernalia. Within that folder was an associated postcard from the travels of a monument in Steenstraete, Flanders.

It instantly stood out to me, shuffling through the holiday memories of a man from another age. The faded, yellowing postcard showed a squat but immense obelisk, surrounded by stepped landscaping that was bare apart from the stone. The text of the postcard reads as follows: '*Monument aux mortes due 418e Regiment d'Infanterie Francais et aux premieres victimes des gaz asphixiant'* which translates to 'Monument to the dead of the French 418th Infantry regiment and the first victims of asphyxiating gas'. My French was just fluent enough to know that I was looking at an indicator of how gas victims were commemorated over one hundred years ago, which presented a really unique way into examining how the experiences was codified and persevered to this day - or so I thought initially.

Image 4.6: Steenstraete Gas memorial © CWGC c1929 ADD9/1/43

The monument, a short, squat obelisk, is set in three terraced squares with one low chain fence that parts to allow visitors to get closer to the base where the above

inscription is carved. The design of the carvings on the monument is three casualties - soldiers who are clawing at their faces and mouths in obvious distress. Their facial expressions are carved to show pain and fear - their eyes are wide and mouths open. There are carved sandbags to set the scene as if in a trench, and the bodies of the three soldiers appear chaotic in this setting, rising out of the flat stone incomplete, appearing less than solid in form. The central soldier, presented vertically on the memorial, is clutching his face and mouth area, but appears in front of the outline of the cross, evoking a crucifixion scene which throws a religious slant on the memorial. Other regimental names reproduced on the red side of the building are the Belgian *Grenadieres*, the *Carabinieres*, the *Artillierie*. When it was unveiled in 1929, early accounts constructed it as rewriting conflict from a Flemish perspective, certainly apparent in its evocative nature.

It clearly shows the horrors of gas warfare in its composition as well as the semiology of what we know to be effigy-like signs of trauma and harm, and what is observable from the carving is pain etched onto the images of the affected men, and provides a jarring exception to the trend of monuments expressing non-political, often religious sentiments of peace. The vast majority of contemporary and modern war memorials near battlefields in Western Europe are abstract in their design, taking forms such as obelisks, pillars, or gently curving stone tablets conjuring up the imagery of religious altars. There is a tendency to the phallic in abstract design symbology, where large, tall and dominant shapes are installed into a landscape. The overwhelming standard in war memorial design owes its influence to a school of architects such as Edwin Lutyens, Herbert Baker or Reginald Blomfield, whose traditional tendencies did not allow for much room for the junior architects (Godden, 2020) or those subscribed to modernist-leaning principles to flourish (Carden-Coyne, 2009).

A few rare examples of realism in memorial design exist, but these are far-between on the Western Front. Cambrai War Memorial has some figures set into the stones at Louverval Military Cemetery. In almost all cases, where the bodies of combatants are etched into commemorative design, they are standing, uninjured; or captured in the moment of intensity - going ‘over the top’ for instance, or crouched, holding a bayonet, about to engage in violence. Closer to home, at Hyde Park Corner, the Royal Artillery Memorial designed by Charles Jagger shows the bodies of its soldiers. One lies, as if in death, arranged in funereal composure alongside the other

three plinths of Portland Stone.

All memorials, even those rare examples featuring a soldier's likeness, are a large and direct contrast to the depiction of fear, weakness, and mortality on the Steenstraete memorial. It is arrestingly "quite different in tone" and "extremely striking in its use of statuary" (Connelly and Goebel, 2018:122) - bringing to life the humanity and wretched humanness of the victims of gas warfare, where "extremely rarely for a military memorial, the soldiers were reduced to a helpless status lacking agency" (Connelly and Goebel, 2018:122). Erected by French veterans, designed by Maxime Real del Sarte (who himself had been a casualty of WWI and lost an arm) there was a public ceremony to officially launch and open the memorial in 1929. Making an unveiling speech, during the dedication of the memorial, General Gourard stated that "this monument has no other aim than to educate; it was not constructed and unveiled amid excitement, nor vain parades. Veterans are not vigilantes, we are witnesses" (*Le Figaro*, 1929, quoted in Connelly and Goebel, 2018:124)

As I broke from examining the contents of the box, I wanted to explore more about this memorial, as it was sublimely raw, representative of the emotive reaction to gas use captured contemporaneously. It was to my shock and surprise to find out that the memorial does not stand today, but was destroyed in 1940 by the Wehrmacht. Connelly and Goebel chart this act of cultural vandalism as memory erasure, noting that when Hitler visited Belgium in June 1940, "not all German soldiers were magnanimous in victory; they destroyed the French gas memorial at Steenstraat…" (2018:152). The reasons for the destruction were not clearly articulated in the archival material, and no German military justification was ever recorded. The obvious conclusion to draw would be that it affected the sensibilities of visiting soldiers, acting as a callous reminder of the evils of gas warfare committed by their predecessors, and was destroyed in an attempt to erase the circumstances from any more public awareness. The Wehrmacht did, somewhat surprisingly, not make a habit of destroying war memorials or cemeteries, and efforts were made to ensure the sacrosanctity of a number of sites across Northern France and Belgium. The desire to erase a memorial from the landscape speaks to the intention of not wanting to acknowledge that the atrocity existed, removing evidence of the reality experienced. However, this has not proven effective. Landscape can be reimagined, certainly there are generation shifts in our understanding and interpreting of landscape, as well as shifts in how it can be

coded. There is also meaning in how landscapes of trauma are preserved through this imagination, such as how Nazi buildings in Kaplan's work were repurposed as hotels - "here, the landscape has been carefully conserved and curated in order to give visitors a sense of being witness, second-hand, to the events that took place there." (Kaplan 2010: 189) The Steenstraete memorial would have helped preserve that sense, and facilitated the 'bearing of witness' for generations to come.

Attempts to destroy the evidence of memorials can be constructed as attempts to alter the perception of the histories they pertain to. The Steenstraete memorial became enrolled in the contentious and violent reaction to evidence of collaboration across Belgium, with Flemish and Belgian experiences and grievances leading to diametrically opposed approaches to memorialising and memory-making – similar to that which is seen in the contested memorial spaces and museum practices of post-Troubles Northern Ireland (Crooke, 2020).

Connelly and Goebel return to the site of the desecrated memorial later in their journey around Ypres, where it was incongruously replaced. "In 1961 a new monument, dominated by a 20-metre-high cross, was unveiled on the site of the one levelled in 1941. The unveiling took place at a time when France was engaged in a bloody colonial war in Algeria, and, at the same time, in a rapprochement with her former arch-enemy, Germany. This was no coincidence. One historian has argued that post-war European integration was built on the twin pillars of remembering war and forgetting colonial violence." (2018:173) There could certainly no longer be a form of remembering the violence of gas use which would have been authentic to the atmosphere created around the original Steenstraete memorial, with its visceral representation of the pain and suffering caused by tear gas and war gases. By reconfiguring the memorial into a cross, there was an attempt to align with the visual cohesiveness of cemeteries for the British, German and French dead (Shelby, 2017).

Tear gas has, and continues to be, presented in museums, monuments and spaces of memory in a manner of ways: as a sombre and saddening consequence of total war, with evocative technological displays situating the use of gas as an opportunity for visitors to the museum to attend a while and reflect on the tales of pain and breathlessness it is displayed alongside; or catastrophic accounts of its devastation visible when requested through the archive – less visible to the publics engaged with

considering the vicarious experience of tear gas use but by no means less potent.

4.4.2 Gas Graves: The Silent Witness

In addition to the postcard described above, the CWGC official had also collated other postcards memorialising and commemorating casualties of World War I. An off-centre wooden crossed, entitled ‘The Silent Witness’ was a significant find in the CWGC archive. It told of the horror of gas warfare by signifying 102 casualties from a single battle: “this memorial is to the men who died of German gas poisoning on the 5th of May 1915” (CWGC, c1915). The light wooden cross does not bely any of the horrors of its caption, acting quite inconspicuously as what could be thought, upon first glance, to be single grave marker, not the hallmark of a mass casualty event.

The way in which the photo is taken makes it clear to see that the cross has been buried in fresh earth, with a background also composed of crosses and other markers which assumption would lead me to believe is in a cemetery in the earlier stages of its development as no formal stoneworks are in place and the landscaping is incomplete.

The cross, showing the names of 102 gas casualties, tells us that it was very much a feared weapon of war and that there can be no attempt to downplay the significance of even early tear and war gases on changing, worsening the battle space for combatants. The context of this memorial being found in the same box as a larger on to other war gas casualties which was destroyed as part of an attempt to erase memory of the horrors experienced tells us that gas use has always been an aberration, even in warfare: which reinforces the futility of finding ourselves as citizens today still vulnerable to the same weapons as those which caused such destruction on the fields of Flanders over one hundred years ago.

Image 4.7: The Silent Witness © CWGC c1915 ADD 9/1/43

4.5 The Troubles

From the scorched earth and billowing tear gas clouds of World War I, I moved forward in time in search of representative examples of tear gas and will now consider the evidence of its use in Northern Ireland in the 1960s. This next section of my chapter on sites of memory and mourning will explain the context of the Battle of Bogside, and explore the digital footprint of a dedicated museum which has artefacts and representations of tear gas use.

Derry[2] was the first planned city in Northern Ireland, with the intent to settle across the county of Ulster with a population supporting the crown - exploiting its maritime status to funnel resources and generate income. Suffering through war and famine, Derry grew sizeably even whilst acting as a major vector port city for travel to

[2] A note on the terminology: Many British Army documents from the period of the 1960S and 1970s utilise "Londonderry", though I will use the name of the local City council throughout this thesis.

America and Canada in the 1800s, and through a period of significant ex-migration. The Irish war of Independence and the subsequent partition saw Derry become a border city, remaining under the control of Great Britain as the westernmost port city of the realm.

In the late 1960s as unemployment and underinvestment grew, Catholics felt discriminated against and civil rights campaigns began to explore the issues of gerrymandering, a territorial political effort to redraw borders for wards and voting areas based on more advantageous distributions of the population. They were considered that at both the local level, and then wider institutional gerrymandering when it came to investment and development, that their city was being removed from their control and a form of annexation was afoot. A planned protest - one of the annual marches of the Apprentice Boys who date back to the 17th century - saw police and unionists lock in running battles and siege tactics with Catholic residents of Bogside, eventually requiring the deployment of the British Army to access the neighbourhood again and restore a fragile order. There were long-standing issues with the RUC, who broke into Catholic homes after a protest in the January of 1969, prompting the barricading of the neighbourhood and some of the earliest graffiti murals highlighting the tensions and divides in the city. The events in Bogside are widely accepted as being the start of the Troubles - a flash of lightning lasting three days which preceded the rolling thunder of the subsequent three decades of violence.

Tear gas use has been heavily conceptualised in commemorative practices regarding The Troubles, including the Battle of Bogside, and remains significant to the communities who experienced it as well as their descendants, the present-day population of Derry and those who come to visit the sites of significance which have emerged, speaking to a dark tourism as well as a city reclaiming its own narratives.

4.5.1 Occupation atmospheres

Tear gas use was headline and lede for much of the contemporaneous reporting of what came to be termed ‘the battle of Bogside’. It is well documented how heavily reliant on tear gas the Royal Ulster Constabulary (the police force that became, through mergers, the Police Service of Northern Ireland (PSNI)) was, and how indiscriminately they used that capacity as a tool of movement repression, intent on denying everyone the freedom to move freely in the space of their own

neighbourhoods. RUC officers moved against the nationalists, dismantling their barricades, smashing the windows of their homes, and then flooding the estate with tear gas in a violent atmospheric occupation. 1091 canisters of CS gas were documented as having been fired into Bogside, with each containing 12.5g of CS; as well as 14 canisters containing 50g of CS for widespread area denial and dispersal. The small canisters contained, at that time, 12.5g of 2- chloronobenzomalonitrile aerosolised with a small explosive charge. If that was not enough, the 14 larger canisters discharged each contained 50g of CS which is more than enough to incapacitate an individual (Himsworth, 1973). Over 14 kilos of tear gas was discharged into the Bogside, at a rate that would almost certainly exceed the acute exposure guidelines followed by present-day policing services and militaries across the globe.

The toxicity of tear gas, explored by the Himsworth Committee as part of the formal Public Inquiry commissioned by the UK Government after the Battle of Bogside shows that in these doses, it amounted to an atmospheric occupation. Upshall reported that "an aerosol concentration of CS at 4 mg/m^3 will disperse the majority of rioters within 1 min, and at 10 mg/m^3 will deter trained troops" (Upshall, 1973 in National Research Council, 2014). The narrow streets of two and three-storey houses, with some tenement buildings and low-rise apartment blocks provided the perfect storm of atmospheric conditions, as tear gas did not easily disperse and was left circulating on the small street-by-street winds over and over. The Saville Inquiry also found abuses of tear gas deployment consistent with a strategic intention to over-utilise the capability on those demonstrators and residents who would be most vulnerable, and about of accordance with unit, regiment or Force policies and procedures: "we consider that there is force in the submission made by NICRA that CS gas was used "*recklessly and precipitately*" at Barrier 12 in view of the fact that it was deployed contrary to the Brigade order and otherwise than as a last resort" (Saville, 2010: 118), providing important context from which to consider how the tear gassing Bogside experienced has become so significant as to feature heavily in their spaces of commemoration.

It was the first time that the RUC had used CS gas with the aims of restoring order, dispersing crowds, and curtailing the riot in Bogside, and escalated to such a level that the British Army were sent in by [the British] Government - where they imposed order by direct rule. The Battle of the Bogside was a seminal moment in the

conflict in Northern Ireland, entering lore almost instantly, aided by the visceral imagery captured in part by Clive Limpkin, Don McCullin and other photojournalists. A BBC report notes that "the shells were fired just before midnight sending a large crowd of youths scattering in all directions. Many sought refuge in nearby houses where residents treated their streaming eyes." (BBC, 1969). While the British Army were initially welcomed, in the hope that they would bring an end to RUC activity which had seen entire streets clouded in tear gas, burnt to the ground, and missiles, rubber bullets, and more used against all residents - young and old - the sense of welcome dissipated along with the last vestiges of the CS, as the Army were to remain for thirty more years, a period known as 'The Troubles'.

There was something in the air as preparations for barricades were made, carving up the passageways of the estate and thoroughfares into dead-ends and clogging the arteries of Bogside with clotted piles of rudimentary incendiary weapons. There wasn't a milk bottle to be found full for miles, save for those now crammed with cloth and a dribble of petroleum. There was something in the air quite literally too, the lingering dust of CS swirling amongst the eddies and updrafts that characterised the 'atmosphere' of Bogside, near-stifling in its occupation of the lungs and eyes of the afflicted - men, women and children - who dared to draw a breath.

4.5.2 Museum of Free Derry

Bogside remains the site of one of the most contentious and contested uses of tear gas in the world; a proving ground for British Army tactics and the uprising of Catholic nationalist sentiments. What began as the ill-conceived route of an Apprentice Boys march on the 12th of August, and a disturbance amounting to marbles being sling- shotted by Protestant marchers near the Bogside (at the junction of William Street and Waterloo Place) with Catholics responding using stones and nails, saw the quick involvement of the Royal Ulster Constabulary, the first escalation on the way to a riotous occupation. This is commemorated through a number of means, though in this chapter I will explore the official museum space which is the site of situated remembrance for the events of the Battle of Bogside.

A project of the Bloody Sunday Trust, "the Museum of Free Derry exists to remember and understand the local history of the city and its contribution to the ground-breaking civil rights struggle which erupted in Derry in the mid-1960s and

culminated in the massacre on Bloody Sunday." (The Museum of Free Derry, 2023). Whilst the main focus of the museum is understandably on Bloody Sunday, the museum does tell the story of the Battle of Bogside through a standalone exhibit featuring photography as well as other artefacts, largely donated by the community from which it is situated in (Hohenhaus, 2023).

The museum is small, and largely focussed on the events of Bloody Sunday, with most of the main exhibition hall and side rooms concerned with the event or the lengthy quest for justice which has followed, and continues to this day. One exhibition shows how tear gas is entangled in the violent atmospheres of remembering the Battle of Bogside, with two main artefacts which I will focus on. The first, a large hand-painted banner, which was displayed by RUC forces attempting to entreat those who had gathered at barricades to disperse.

Image 4.8: Museum of Free Derry, 4a "heavy handed reactions" (Hohenhaus, 2023)

A close-up on the cabinet in questions shows a range of weapons and ancillaries, including three CS gas canisters.

Image 4.9: single shot riot gun also known as a rubber bullet gun with rubber bullets, CS gas canisters and plastic bullets on display at The Museum of Free Derry (McBurney, 2019)

They are presented alongside a projectile launcher, which could fit smoke or baton rounds - two 'less lethal 'options which still wreaked harm and pain on those subject to their deployment. Between the canisters, the other weapons, and the stark warning traced onto a banner, the threat is overt and cold: *'disperse or we use tear smoke'* (Free Derry Museum, 2023). It shows us that there was time to prepare materials threatening the use of CS gas, that the deployment was not sudden or without a build-up. In doing so, it portrays the idea that the aim of RUC activity, and later involvement of the British Army, was always to use CS on residents of the Bogside, that tear gas use was the intention and not the consequence of an assembly which became unmanageable by security forces. This insight into the construction of a narrative of remembering shows that the Museum of Free Derry plays an active role in constricting remembrance regarding the events of the Battle of Bogside.

Displaying the materials used by RUC and British Army to bring violence to the inhabitants of Bogside alongside some of the materials which they utilised to counteract the occupation shows us a number of things. Firstly, that tear gas is very much a tool of state power, there are no countermeasures deployed by civilians which

can equal the ferocity or toxicity of CS canisters. Rocks and dustbin lids, even Molotov cocktails, do not bring about the same atmospheric harms and suffocate the air in the same way that the overwhelming load of tear gas which lingered about the narrow, confined estates did. Secondly, that tear gas is significant to a narrative of victimhood because of this: the inhabitants of Bogside were overpowered by conventional and gas weaponry.

The Director of the Museum has explained their perspective, designed into the museum, is not one of partisanship, and deliberately demonstrated throughout the space of the museum in order to generate a feeling of authenticity, a postmemory for those who visit as well as those who are now generationally removed from the events of 1970. “In many, if not most, cases the ‘official ’history of events, as seen in the media and elsewhere, is completely at odds with the experiences of the people who were actually there. This leaves people feeling as if their experience has been ignored or cheapened. Setting up their own museums, based in their own communities, gives people a way to get their experiences across, to be listened to and understood after years of being ignored” (Kerr, 2013:293).

This has not been an endeavour entirely removed of controversy, however, and whilst the museum has attempted to centre the experience of people in the local area, it has also fallen foul to challenges of partisanship and even erasing the struggle of local residents. “The creation of a “people’s museum” in a deeply divided community, marked by trauma and still experiencing the after-effects of long-term conflict, is not a neutral act. There are complex personal and political hostilities that make intra-community consensus difficult to find” (Greavu, 2019). This was exemplified when the exhibition of a list of names of people killed in the Free Derry area from 1969 to 1972 led to a sit-in protest from relatives objecting to their family member’s names being listed alongside British Army personnel, and the exhibit was removed in 2017 (Steel, 2017). However, it persists to this day as a visitor attraction for tourists to Derry, embodying the dichotomy between dark tourism and post-conflict transformation (Cochrane, 2015) as the city around it attempts to reinvent and reimagine itself as a city of culture, not confrontation.

Similar experiences in shaping contested spaces of memory-making in Belfast have generated reflections on the politics of witnessing and remembering, as well as

how to navigate the polarities of narrative traditions. “Memorialisation remains a divisive and contentious process in Northern Ireland” (Mathuria, 2024:213) and all at once a multitude of perspectives can be engaged or enrolled in how the affective atmospheres of a contested space are made and remade. Outside of the museums, which tend towards the more rigid and permanent iterations of memorialisation activity, there are efforts to explore place through ‘melancholy survivals’ (Lloyd, 2000) and the “spatial hauntings that are revealed through embodied, affective place-based memorialisation” (Mathuria, 2024:213).

4.6 Airborne Assault Museum

Found at IWM Duxford, though unconnected to the hanger it finds itself in where Concorde looms over other preserved or replica aircraft, the Airborne Assault Museum dedicated to the story and exploits of the Parachute Regiment occupies a single long gallery, where the path of visitors completes a full circuit of the exterior walls, moving chronologically through the development of airborne infantry in 1940 into exhibits about each of the conflicts they have been utilised in. This museum, whilst small in size, has a large number of exhibits and is well lit and signposted. It is also supported by a digital archive connected to the National Army Museum.

Here, on a number of visits, I was drawn to the stretch of cabinetry housing exhibits from service in Northern Ireland, struck by the parallels with the Free Derry Museum in terms of curatorial decisions, yet also able to interrogate the differences between the two sites of remembering. The museum displays an S6 respirator, noting that it was “issued as protective mask from the 1960s to 1980s. It protected the wearer from smoke and tear gas” (AAM, 2023), articulated in the passive voice rather than the active and which brings to bear the question: who introduced the tear gas to Northern Ireland?

Unlike other pieces of PPE, including Kevlar helmets or body armour such as fragmentation vests, civilians in Belfast or Derry did not have access to the material which the wearer required protecting from. Rocks and bricks were frequently utilised as weapons by rioters at barricades, which necessitated a certain degree of padding and protection for key limbs and organs. Unlike in WWI, however, where both sides of combatants had access to the capability which rendered wearing a gas mask essential,

only one side of the conflict would be responsible for the deployment of tear gas, unto anywhere from dozens to thousands of unprotected civilian bodies at a time.

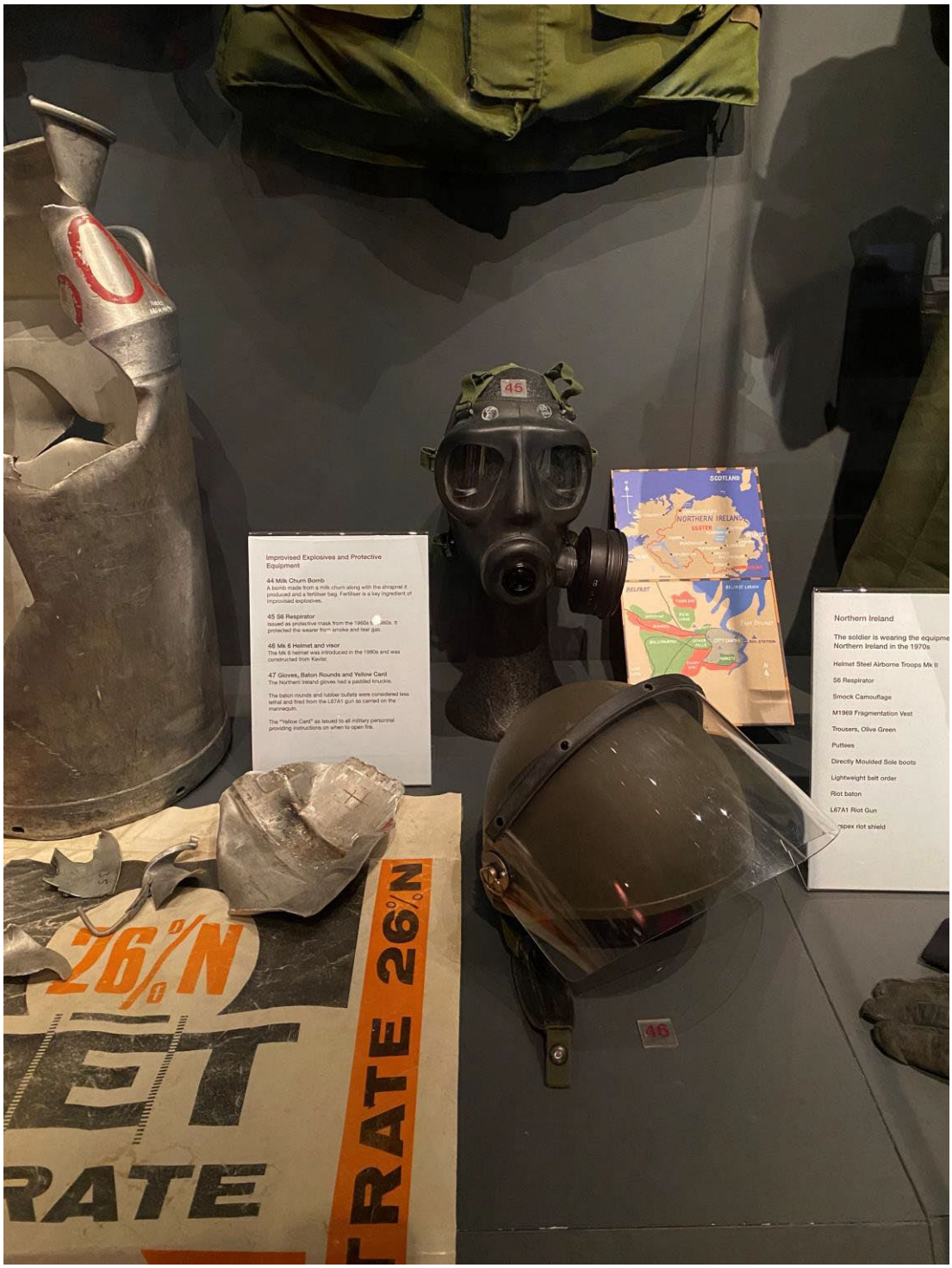

Image 4.10: S6 respirator at the Airborne Assault Museum, Duxford (Author, 2022)

That the Airborne Assault Museum attempts to exert, forcefully, a version of history which may not have been representative of the experience of people living in Derry or Belfast in the 1970s was never in doubt - the spaces of militarised memorial

are rarely self-reflective or self-critical. I found an amusing irony regarding the literature in the Museum that spoke of the deployment tear gas by Parachute Regiment soldiers during their service on Operation Banner in Northern Ireland from 1971 onwards, mostly regarding the nomenclature. To be 'airborne' - as in, *to go to war from the air* (Kershaw, 2008) the soldiers were, at once, an Airborne assault utilising an airborne assault.

The effect of Tolia-Kelly's work is to construct the museum as a site of violence and one where "the effect is to experience an atmosphere of loss, guilt, sadness and anger concretised along geometries of imperial power" (Tolia-Kelly, 2016:899) Thinking about who the museum recognises as experts - is it those who have studied the history, sociology and context of the actions which are being memorialised, or those who have experienced them - especially from a power disadvantage of being an opponent or enemy. There can be no universal accounts of violence or tragedy that brings together combatants or works across the lines of participants in events which are sought to be memorialised - "any universalist account of affective experiences risks ethnocentrism" (Tolia-Kelly, 2016:900) as writers such as Ahmed (2004), Hemmings (2005) and Thien (2005) also argue; power, especially that which can be found as having materialised in the museum space, is relies on the exclusion of expertise and experience.

I found this most apparent when being in the Airborne Assault Museum and pondering the significance of their gas mask exhibit, especially in comparison to the gas mask in the Free Derry Museum which was embodied with the context of tear gas having been used upon the community. Viewing them both, however, allowed for a cultural encounter with the self as part of my ethnographic experience, where the "inherited geopolitical hierarchies of race and culture (Tolia-Kelly, 2016:12) provided the backdrop for both a way of seeing, and a way of refuting what was presented. Tear gas, in both examples, is also presented as a point around which dissent is galvanised, and a legitimate object to protest against the use of, by creating or adapting everyday objects in an attempt to construct protective equipment that allows the wearer to receive an approximation of the same level of respiratory protection that those who deploy it are given. As I moved through the sources of this chapter, it was evident that the design and curatorial process was highly influential in creating a space for commemoration - joining together stories of ordinary soldiers alongside their military and political

leadership, moving subtly between the experience of the front line, the Home Front, theatres of conflict and a multitude of spaces in-between.

4.7 Disobedient Objects

In this section I will talk about how tear gas use and experience is presented in ways which challenge the accepted state-based structures of just war and justifiable violence against an enemy; enrolling instead political activism, protest and civil disobedience. A visit to the Victoria and Albert Museum in 2015 introduced me to Disobedient Objects, a now-closed exhibition which examined the "powerful role of objects in movements for social change" (VAM, 2015) by showcasing rebellious and defiant objects from across the globe, focusing primarily on the period of 1970 to the present day, although also containing material from the early 20th Century, including a Suffragette tea set.

The exhibition, accompanied by a blog written by curators, conservators, technicians and the objects' owners, was an illuminating change from the sombre and state-centric narratives which pervaded at the museums and sites of memory encountered earlier in this chapter. There was a palpable sense of dissent, from the objects themselves which were often deliberately and carefully design to resist state power and violence, protecting the right of protest for the protester, as well as from the setting, captions and ephemera that accompanied the exhibits, including a number of take-home 'how-to' guides created for the exhibit, which (anecdotally) were subsequently used by protest groups around the world (V&A Museum, 2015). There was also challenge to the V&A directly, and to museums generally, regarding the exhibition's existence: "Disobedient Objects enters these conversations, challenging the Museum by confronting it with objects that demand to be treated differently. The project has been described to us as institutional critique and there is inevitably some truth in this. It prompts the question of whether the Museum can resist the urge to recuperate these objects. In the nineteenth century it was claimed that museums could prevent riots and sedition (as well as drunkenness) by mopping up working-class leisure time. What happens when you place disobedient objects at the heart of a building that was conceived for such obedient purposes?" (Flood and Grindon, 2015:19). It came to me as a trace, late in 2020, when I realised that the three largest sites which I had travelled to in order to form part of the data collection of this chapter

were all intrinsically linked to the power of Empire: whether that relate to the Imperial, the Commonwealth, or the museum bearing the name of one of Great Britain's longest serving monarchs whose influence on global geopolitics is undoubtedly paramount.

The design of the exhibition space was meticulous, whilst intended to be navigated circuitously it was also easily approachable from any angle, and as I wandered around the space, I gathered the sense that it would not have made any practical difference to engage with objects chronologically or thematically, as in other museums and spaces of memory projection which were visited or encountered during this chapter.

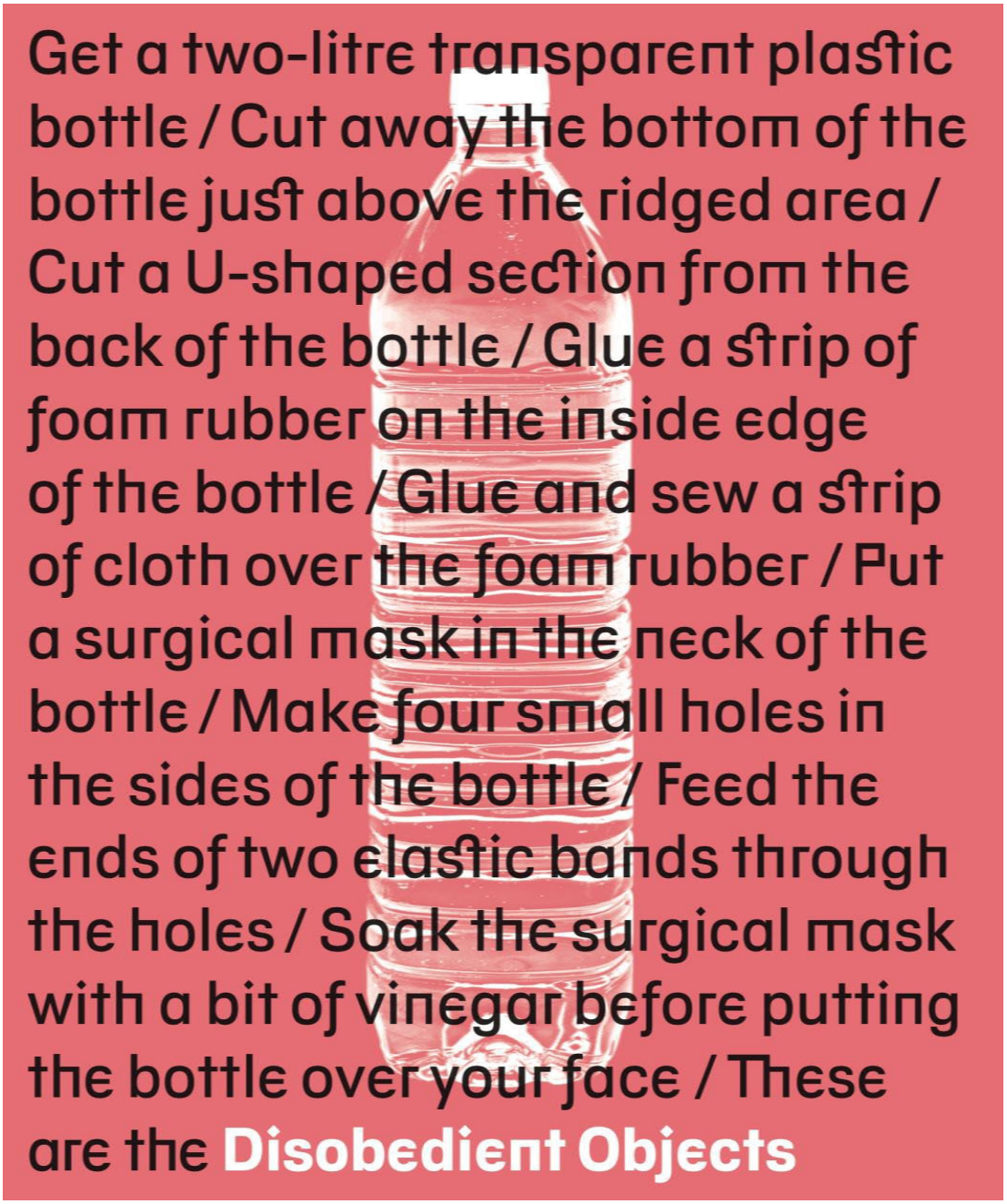

Image 4.11: instructions on making a tear gas mask (V&A, 2015)

Even the typography was so markedly different from anything that I have seen in a gallery before, particularly one of the most famous and well-attended in London. The font, created specifically for the exhibition, was jagged and cursive at the same time: with connective arcs rising from each "S", yet the usually arched lines of 'M's and 'N's was direct and straight. The typography was a visual indicator of difference: this exhibition was not about joining a stylistic convention. The instructions on making a tear gas mask and application of a homemade tear gas mask posters were both slickly designed, with bold and eye-catching font and colourways in direct contrast to how the small exhibit cards detailing the origins and nature of gas masks in the IWM and Airborne Assault Museum were presented.

At the time of the exhibition, tear gassing was occurring with alarmingly regular frequency in America. Following the shooting of teenager Michael Brown, a peaceful vigil marking his death turned into an assembly at the town hall, where grieving and traumatised members of his family and community were met with militarised police units, CS, and later on - the US National Guard. I will discuss more on the Ferguson protests in subsequent chapters, including the gesture geopolitics of 'Hands Up, Don't Shoot' and how the Black Lives Matter protests of 2014 became intrinsically linked with an abundance of tear gas misuses, drawing global solidarity.

Other things that we curate speak to the impact of tear gas use, particular in how it can prompt inventiveness, direct-action challenge and an ethos of resilience through remembering, where citizen-led advice on how to protect oneself is shared and thankfully captured for posterity. Whilst tear gas (the compound) is not present in museums or memorials specifically, the legacy of its impact can be gleaned from displays including empty canisters or other ancillaries, particularly masks – where the material mechanism of managing the risks of tear gas exposure are the first opportunity for a direct comparison between state and civilian power.

The disobedience of turning everyday objects, including plastic bottles and vinegar, into protective material is contrasted with the exhibition at the Airborne Assault Museum, where a bespoke, military-issued gas mask is presented as the gold standard in personal protection. Without access to designed or bespoke solutions, protest movements have learned from the detrimental experiences of tear gas use to develop citizen-led initiatives to minimise its harmful impacts in the immediate

aftermath of exposure. Moving around the Disobedient Objects exhibition, I also drew parallels with the early gas masks and gas hoods of the Imperial War Museum, thinking of how uncomfortable they must be, but how over the last hundred years the necessity to design and wear them has been increased as well as being civilianised.

Image 4.12: Take-away ‘how-to’ guide to make a tear gas mask (V&A, 2015)

The inclusion of a how-to guide supporting protestors in counteracting the effects of tear gas deployments is significant: it tells us that there is an implicit expectation that tear gas will be experienced by people who are engaged in protest, attempting to voice criticisms or concerns, and they go into doing so fully minded that they may be subject to governance via the manipulation of violent and hostile atmospheres. This means tear gas use is intrinsically tied to the policing of protests and the experience is significant enough, notable enough, worthy enough for there to be a need to develop countermeasures designed to help people to breathe safer.

Comparing the museum spaces exhibiting official (military-issue) and unofficial (citizen-designed) tear gas masks shows the span of how tear gas figures in the work of remembering - it is both visible and accidental to the events which are being commemorated, in this case the deployment of tear gas, both by and on the people who are the focus of each respective museum space. I felt it was important to consider who each museum or space of memory was for: yes, everything is accessible to the general public, but there may have been far greater appeal to engage with either a state (Imperial / Commonwealth / military) source rather than a subversive, citizen- based exhibition dependent on personal background, beliefs and behaviours. Moore offered a theory on the duality of Disobedient Objects: was it "a nod by the cultural elite towards free speech and expression, and yet another example of a sop to the masses from an outwardly liberal state to dissuade us from more serious uprisings? Or is this exhibition a reflection of the growing climate of unrest around the world, a culture of resistance that perhaps many more people will engage with now that it's won the stamp of respectability endowed by museum status? My feeling is that both elements are true" (Moore, 2014).

The disobedience of turning everyday objects, including plastic bottles and vinegar, into protective material is contrasted with the exhibition at the Airborne Assault Museum, where a bespoke, military-issued gas mask is presented as the gold standard in personal protection. Without access to designed or bespoke solutions, protest movements have learned from the detrimental experiences of tear gas use to develop citizen-led initiatives to minimise its harmful impacts in the immediate aftermath of exposure. Moving around the Disobedient Objects exhibition, I also drew parallels with the early gas masks and gas hoods of the Imperial War Museum, thinking of how uncomfortable they must be, but how over the last hundred years the necessity

to design and wear them has been increased as well as being civilianised. No longer is personal protective material a requirement in the military or policing, but in the streets and squares where anyone can be subject to state-sponsored tear gassing.

4.8 Conclusion

Throughout this exploration of the curated spaces and objects of tear gas use, there were frequent opportunities to reflect back to the research question: what is the human experience of tear gas use, and what is its impact? Thinking of how the sources were able to present the vicarious experience of tear gas use, some early and powerful conclusions can be drawn from both the textual and the visual representations of curated material, in the way in which state-led or 'official' memories of tear gas use were preserved and promoted. A dichotomy emerged in the ways and means that curated spaces were able to demonstrate the vicarious experience of tear gas use. Far from being analytical and evidential, the museum sites explored during this chapter were subject to as much design and deliberation as creative expressions of the vicarious experience of tear gas use in chapters to come, whether that was due to the adherence to state-based commemorative practices or the spontaneous and variable acts of curators, witnesses and visitors to the museums or sites of mourning.

As I spent more time with the objects, the exhibitions, and the spaces of commemoration I returned often to this question, and considered how, given it is so temporary and fleeting as an object when used - both nebulous and unquantifiable, a misty, cloudy, collection of droplets that fades from both the skin of victims and the land upon which it is used, it becomes so permanent - changed and altered when it is remembered. In the spaces of the museums and archives I visited, it was clear to see the care and attention which had been taken to paint an evocative portrait of how gas was used in WWI and to show how truly it deserved the term 'frightfulness', persisting to the present day.

5 Things we capture: audio, video and photos of tear gas use

"Every contact leaves a trace" (Locard, cited in Kirk, 1953:4)

"Wherever he steps, whatever he touches, whatever he leaves, even unconsciously, will serve as a silent witness against him… This is evidence that does not forget. It is not confused by the excitement of the moment. It is not absent because human witnesses are." (Locard, cited in Kirk, 1953:4)

5.1 Introduction

This chapter deals with the examples of representative experience of tear gas use that have been found in photography, audio recordings, and videos produced over the last 100 years. It aims to explore what they represent, and offer an interpretation of how tear gas is characterised in that representation. It pulls together archival recordings of the experience of tear gas use, oral vignettes I accessed through the Imperial War Museum's expansive oral histories project, as well as footage from protests across the world - in still or moving forms. Powerful documentary photographers contribute to this chapter, including two whose imagery was the inspiration behind sources in the next chapter to come, where I will explore representative experiences of tear gas use which have been created.

The sources I examined in this chapter are primarily non-fictional, in contrast to the more artistic interpretations of the chapter to come, or indeed the examination of designed and curated spaces in the first empirical chapter of this thesis. Considering the "things we capture" as a distinct data set from the "things we create" allows for a change in the approach from understanding the allegorical to the actual circumstance, and accordingly, our examination of the experience of tear gas use can be brought into greater focus, stemming as it does from documentary evidence rather than personal interpretation.

Using sensory ethnography to explore the digital imagery or sources to understand how the experience of tear gas use is represented as something what can be witnessed 'second-hand' in a process of "retrospective witnessing by adoption" (Cronshaw, 2004:215) this empirical chapter both looks at and listens evidence of the experience of tear gas use, asking 'what does it tell us and what can we learn from this?' - aligning with the research questions which are outlined in the previous chapter. In many cases, the sources of evidence have enriched their contribution with notes,

captions or explanations which I have utilised to add explanatory context to the evidence I am presenting, and to help shape the understanding of what our captured experience tells us about tear gas use.

This chapter will move between eras and types of sources in an attempt to both construct an overarching narrative about what representations of tear gas use can tell us about the experience of its deployment. As before, some of the embedded sources are videos, which are playable utilising the embedded links - though this is not essential as each will be fully explained and the experience contextualised. I have collated the different data sources in this chapter into a table, to aid in the understanding of where each section will travel, and how the initial categorisation has taken place.

Title	Date / era	Type of source	Creator / source
Dressing station	WWI	Photograph	Pictorial Press Ltd
Ribemont Gas School	WWI	Video	IWM
Oral Histories	WWI and The Troubles	Audio recording	IWM
Three weapons of Bogside	The Troubles	Photograph	Clive Limpkin
CS gas triptych	The Troubles	Photograph	Clive Limpkin
Boys escaping CS gas	The Troubles	Photograph	Don McCullin
That's me in the photograph'	The Troubles	Photograph and prose	Don McCullin / The Guardian
The Square	2010s – 2020s	Video (documentary film)	Jehane Noujaim / Netflix
SAS 'Who Dares Wins'	2010s – 2020s	Video (reality TV show)	Phil Turner / Channel 4
Hands Up, Don't Shoot'	2010s – 2020s	Photograph	Scott Olson
Returning CS canister	2010s – 2020s	Photograph	Robert Cohen

Table 5.1: Sources in Chapter 5 (Author, 2022)

Across this collection of selected, determined pieces of evidence, from conventional news media to new and social media forms, there is a substantial thread running through regarding the abject and terrifying realities of tear gas use, showing me how the experience is represented in cautionary tales, trauma memory and a multitude more means of countering and criticising its use to this present day. There are also moments of brevity, too, from the sights of reality TV stars being tear-gassed as what could be argued is part of a publicity stunt, to the vignettes which emerged when I was discussing and analysing a video of a gas training school with colleagues aware of my other research interest - UK civil contingencies, preparedness, and the exercising of affects of security. These provide a short interlude as I largely move through representations of tear gas as a violent and harmful object, one which people are subjected to under riotous atmospheres or Imperial occupations. Several of the themes in literature also translate to this topic, including how the evidence of tear gas use becomes a source to use in the vicarious retellings of the experience or creation of landscapes of postmemory (Jones and Osborne, 2020) which can further be interrogated through exploration, challenge or support.

Through this chapter I have juxtaposed a number of different reflections regarding tear gas use. For some of the sources it is benign and easily countered. For others it represents trauma, and the experience – which can not be easily forgotten – is presented as evidence of not an inherent goodness or badness of tear gas, but an inherent wickedness. To saturate the Bogside, seeping under every door and in through every window in photos essential recording the chemical occupation of a place (Limpkin, 1972) promotes a narrative of tear gas being invasive and permanent. With every reflection that talks about the effects of tear gas lingering into the medium term, for example, the blinded men in a photograph huddled outside an aid station, there is weight being added to the perspective that tear gas is abhorrent, and the experiences of people who have been exposed to it should not be treated lightly. Although, in this chapter I have introduced a number of other sources who do not take the same damning or fatalistic position, but present the evidence of their experience of tear gas as no more than an inconvenience. Tear gas canisters flying overhead does not stop protesters in Egypt galvanising the power of their frustration with the political system to advocate powerfully and passionately for an alternative, it only deters them from going down the most smoke-clogged streets and squares in an act of temporary displacement. It was a mere tool of amusement for Parrett during his military service too, and whilst spoken

of with revulsion by a number of colleagues in their vignettes, would not be the most traumatic experience of their policing service by a long way.

Navigating between the reflections of tear gas use which are interpreted and created, as in the subsequent chapter, as opposed to the experiences of tear gas use which are captured evidentially has been an interesting aspect. A number of the sources are more intrinsically linked than first conceptualised, and a number more resist all attempts at categorisation or coalescing into a dominant narrative. However, each aspect serves its own merits, and it is only through a process of jointly appreciating, linking, comparing and understanding that we can come to the conclusion that the phenomenological nature of the material we create about tear gas use helps us contextualise what is captured as raw, non-illustrative data with an emotional aspect.

5.2 Photographic memories, photography as memory

Visual geographers like Rose work to the assumption that "the meanings of a photograph are established through its uses" (2000:555) and whilst photos are an excellent and important source for geographers alike - whether historical, cultural or social - they are not just an accurate record, but rather a means of producing imagined geographies, serving interests, and acting as "social constructs capable of performing ideological work" (Schwartz, 1996:29). The cautionary nature of this realisation is summarised by Rose's argument that "three interrelated elements should be considered in relation to the practices of the photographic archive: the in/disciplines of the archive, the visual and spatial resources offered by particular photographs, and the desires and imperatives driving the researcher" (2000:567) and that the instability between the photograph [or the source more generally speaking] and the researcher requires acknowledging as well as clarifying. Clearly there will be an interpretive element to the photographs I have gathered; this is my research project after all, but I have taken steps to also record the original context courtesy of the photographer or original witness in order to better understand what the source tells us about the experience of tear gas use. In doing so, I have attempted to counteract two assessments made by Barthes'; firstly that: "Photography never lies; or rather, it can lie as to the meaning of the thing, being by nature tendentious, but never as to its existence" (Barthes, 1982:87) and secondly that: "I cannot penetrate, cannot reach into the Photograph. I can only sweep it with my glance, like a smooth surface. The Photograph is flat" (Barthes, 1982:106). The photographs, as well as the videos and audio recordings of this chapter,

are not flat: they are rich and lively with matters of interpretation and reinvention, as well as pertaining to an essential record.

5.2.1 Essential record

That essential record pertains to not just difficult or dangerous personal experiences and the trauma that generates for those who lived them, but potential evidence of human rights abuses. Documentation of the proliferation of tear gas is produced through photography from both official sources: photojournalists and news media, as well as the unofficial - everyone armed with a smartphone at a protest may be capable of recording the harms affecting them, which has brought focus and to the issue of tear gas use in the last two decades.

Tear gas use is catalogued in a number of ways. Numerically, there will be a record of the quantities and deployments by the authorities who utilise it, if only in terms of an inventory of what they are required to restock. Charting the 'everyday suffocations' of conflict in Kashmir, Kaur (2002) quotes Ganai in stating that "Sources say all police stations in Srinagar's old city and urban centres elsewhere in the state are always kept well-stocked" (2019) and there will be dark bureaucracy (Weber, 1972) at play with regards to the procurement and storage of RCAs like tear gas, particularly with considerations about budgetary allocation in policing services which are funded by state or federal taxes. From a visual perspective, the overwhelming spread of personal mobile phones, with an estimated 6.7 billion smartphone users in 2023 (Taylor, 2023) has given rise to the concept of the 'citizen journalist' (Greer and McLaughlin, 2010: 1041) and is significant for the task of capturing evidence of tear gas use as well as bringing new challenges to researchers regarding the preservation of evidence. "Potential evidence should be preserved as soon as possible. The novelty of digital landscapes makes it seem incongruous to approach online material as historical evidence, but like any form of documentation, it risks damage and degradation or editing. Managing storage is crucial, as both hardware and software can rapidly become redundant (Ng, 2020)" (Lyndon and Nyarko, 2022:12). It is this photographic evidence that gains in significance from the act of being preserved and shared, utilised to build part of the growing understanding of its disproportionate use and aiding in calls for a review of the legitimacy of tear gas use. When "citizen journalism challenges the official truth … it becomes most potent as a news resource" (Greer and McLaughlin, 2010:1056).

5.2.2 Aid Station, Bethune

The first photographic record of tear gas use I will explore in this chapter dates back to 1918; over one hundred years ago. It, like a number of photos which will be analysed and interpreted in this chapter, provides the inspiration for a piece of artwork which will be discussed in Chapter 6, showing how some of the sources of truth and experience of tear gas use are subject to further examination and interpretation, fuelling other forms of memorialisation.

Despite fervent attempts to issue troops with protective equipment that might counteract the symptoms of a gas attack - from tear gas frequently used in trench clearances to the infinitely more toxic deployments of chlorine and phosgene gas which became hallmarks of large, planned offensives - the success rate of this equipment was low. A haunting photograph taken towards the end of WWI shows even the tear gas used was having a devastating effect on the bodies of soldiers. Static in a line with little awareness of their surroundings, most with covered faces, a group of British soldiers waited for aid at a dressing station near Bethune in 1918. The title of the photograph alleges they were blinded with tear gas - difficult to reconcile with the present-day ideals that tear gas is 'non-lethal'; given that life-changing and life-threatening injuries have been a hallmark of tear gas use since its inception. The line of soldiers from the 55th (West Lancashire) Division is huddled waiting treatment at an advanced dressing station near Bethune on 10 April 1918 during the Battle of Estaires in Flanders, France. The fragility of those men affected by tear gas is exposed as they stand, linking their bodies together for stability and direction, they are blind to their own vulnerability. Tear gas has introduced a precarity to their situations: it may pass, but it may also worsen, and the broken bodies of men likely experiencing gas shock is testament to that.

The physical effects of tear gas use have been captured in startling detail in this photograph: temporary blindness and a compromised awareness of one's surroundings.

Image 5.1: an image reminiscent of John Singer Sargent's famous painting 'Gassed' © IWM Q 11586

What the photo does not portray is the psychological effects of tear gas use in World war I, so through interpretation as well as testimony, there is an opportunity to protect a possible context onto the picture. "Because both gas fright and gas attacks became more severe in 1917 and 1918, doctors and medics found it difficult to diagnose real as opposed to imagined gas attacks" (Fitzgerald, 2008:617). This escalated gas warfare to a form of terrorism, where "the constant threat of exposure to even a single gas shell added to the already unbearable stress of life at the front. The fear of being gassed, along with periodic harassing gas attacks, kept soldiers on both fronts on edge and could lead to anomie, gas fright, and in some cases mental breakdowns" (Fitzgerald, 2008: 617). This is significant not only because it shows the use of tear gas in World War I continued even after more toxic and harassing war gases were introduced, making it a legitimate facet of the gas war in its own right, but because it shows that an amount of time and energy was spent on making it a key tactic of war to frustrate and harass those who fell victim to it.

This photograph also tells the viewer more about how the experience of tear

gas can play out in terms of the human response. Whilst the men are still able to stand, they are powerless to fight back - being as it is that so many of them have lost their sight (even if temporarily) and therefore are left reliant on the collective direction of their human chain in order to move. Thinking of the use of CS in contemporary protest situations today there are parallels: policing agencies want to break apart the crowd, to force it back into becoming less than the sum of its parts, and weaken the connections between each individual. Precisely the sentiment portrayed by this photo, of man's need for connection to his fellow man, is what is being destabilised and compromised by the deployment of tear gas as a dispersal tool.

5.2.3 Clive Limpkin

Clive Limpkin's photographs of the Battle of Bogside are instantly recognisable, and form the frames of reference for a number of the murals which have been painted on the sides of residences and businesses in 'Free Derry'. One, in particular, has almost become synonymous with the period: his photograph of the young Paddy Coyle. In his book, Limpkin writes "if ever there was a defining image of the Battle of Bogside this was it, landing in my lap on Day One. Wearing an oversized gas mask, clutching a petrol bomb and with a badge capturing the core issue prominent on his jacket, he taunted the police to come within range. He was thirteen." (Limpkin, 1972:76). The mural derived from this photograph is itself, "iconic and recognized the world over" (Anderson, 2020) and will receive treatment in Chapter 6 in which I will discuss in the subsequent chapter focussing on things we create to tell the story of tear gas use.

I bought the special, 50th Anniversary reissue of Limpkin's book, The Battle of Bogside, and it was an excellent source; filled with his observations, tinged with an exhausted sense of facetiousness as well as thinly-veiled fury in parts, it provided great insight into what the originator of the photos was going through in order to capture such pivotal moments. Limpkin writes with the breathless enthusiasm of realising that it is all happening and he can bear witness, whilst still struggling to comprehend the enormity of the event. "Regaining my breath, I hurried back to Aggro Corner where the RUC were firing CS gas at the choking Bogsiders who were replying with petrol bombs and rubble. The pictures came on like a tap - all you had to do was press the button" (Limpkin, 1972:9). Full of his observations of the use of destructive weapons which saw the neighbourhood scarred irreparably, from bricks and firebombs, the book

also charts what humanity remained despite, or in spite of, the systematic ruin of the fascia and fabric of the community, in the everyday, mundane, banal actions of Bogsiders attempting to navigate around the barricades and checkpoints of their new twisted geography. The photos Limpkin took are a useful source to chart the destruction, with each week that passed the background changes – rubble piles up and the once accessible estate becomes a tangled mess of ad-hoc barricades, bricks and barbed wire.

During the Battle of Bogside and The Troubles, some photographers were reduced to recording without seeing. This paradox is exemplified in the case of Constable Robert Simpson of the RUC, who was assigned the duty of photographing potential criminal activity in Derry on the 12th of August 1969. All he could later tell the Scarman Inquiry was "During the period I was there I did not see any civilians throwing stones." The pithy reply, from Lord Scarman: "But your camera did". Simpson's reply: "Oh yes, I probably did, but as I say I did not see it; my camera was held above my head" (Scarman Inquiry, 1969 quoted in Hanna, 2015:457).

Not so for Limpkin's work – the narrative that sits behind it in the form of his captions is so visceral that the reader can scarce believe he took his eyes off the action for a second to change rolls of film. Limpkin's photographs are an exceptional source from which to consider how tear gas use in Northern Ireland was experienced by the residents of Bogside, and what that can convey about its effectiveness and legitimacy.

Image 5.2: petrol bomber confronting British troops © Limpkin 1972

Every action has an equal and opposite reaction; except maybe for this. Here the petrol bomb is cast heavenwards, in the direction that a rock and a canister of CS have been propelled from. “Ahead of the crowd, he screams abuse before throwing his petrol bomb at a line of RUC who respond, creating a rare moment when the three major weapons of Derry fighting are captured mid-air in the same image - the petrol bomb (top), the stone thrown by the RUC officer on the right, and a CS gas canister ahead of the discharge smoke.” (Limpkin, 1972: 46) This presented the image of an ideology that was totally resistant to the British Army’s capability and capacity – what could they fear from rocks and tear gas when armed with 30,000 milk bottles’ worth of Molotov cocktails? Limpkin’s photographs are a key proponent of the agency of the Bogsiders, who were not just being occupied by an alien force, but actively resisting it. In this vein, “the existence of certain photographs served to anchor discussions of trajectories of violence around certain places and moments” (Hanna, 2015:457).

This photograph of the weapons of the Battle of Bogside provides a useful contextual standpoint to our understanding of tear gas use in Northern Ireland. It did not prove a decisive enough tool to disperse the crowds; being countered actively by the faces of the Bogsiders wrapped in scarves and towels; and even being deployed in

the quantities on record provided no strategic advantage to either the RUC or the British Army outside of the temporary traumas it causes the residents.

The next excerpt from Limpkin's work is captioned with a paragraph regarding CS gas: "While it can be highly effective in crowd control, CS gas is notoriously uncontrollable as it drifts. Dr Ben Corson, co-inventor of the gas, has called it 'a service to mankind', a description rarely used by Bogside inhabitants who suffer choking, weeping and vomiting as it arbitrarily seeps into every room of every home, attacking old and young with impunity, day or night" (Limpkin, 1972:50). The double- page spread, made up of three images [I have scanned it as two; overleaf] shows the everyday quotidian violence of tear gas deployments in Derry. For the residents, holding handkerchiefs over their noses and mouths as they wanted around the rubbled streets of Bogside, tear gas has become just another facet of their existence. They persist in defiance of Corson's assertion that he had synthesised a 'service to mankind', overcoming the atmosphere of occupation that seeps ever deeper into the community.

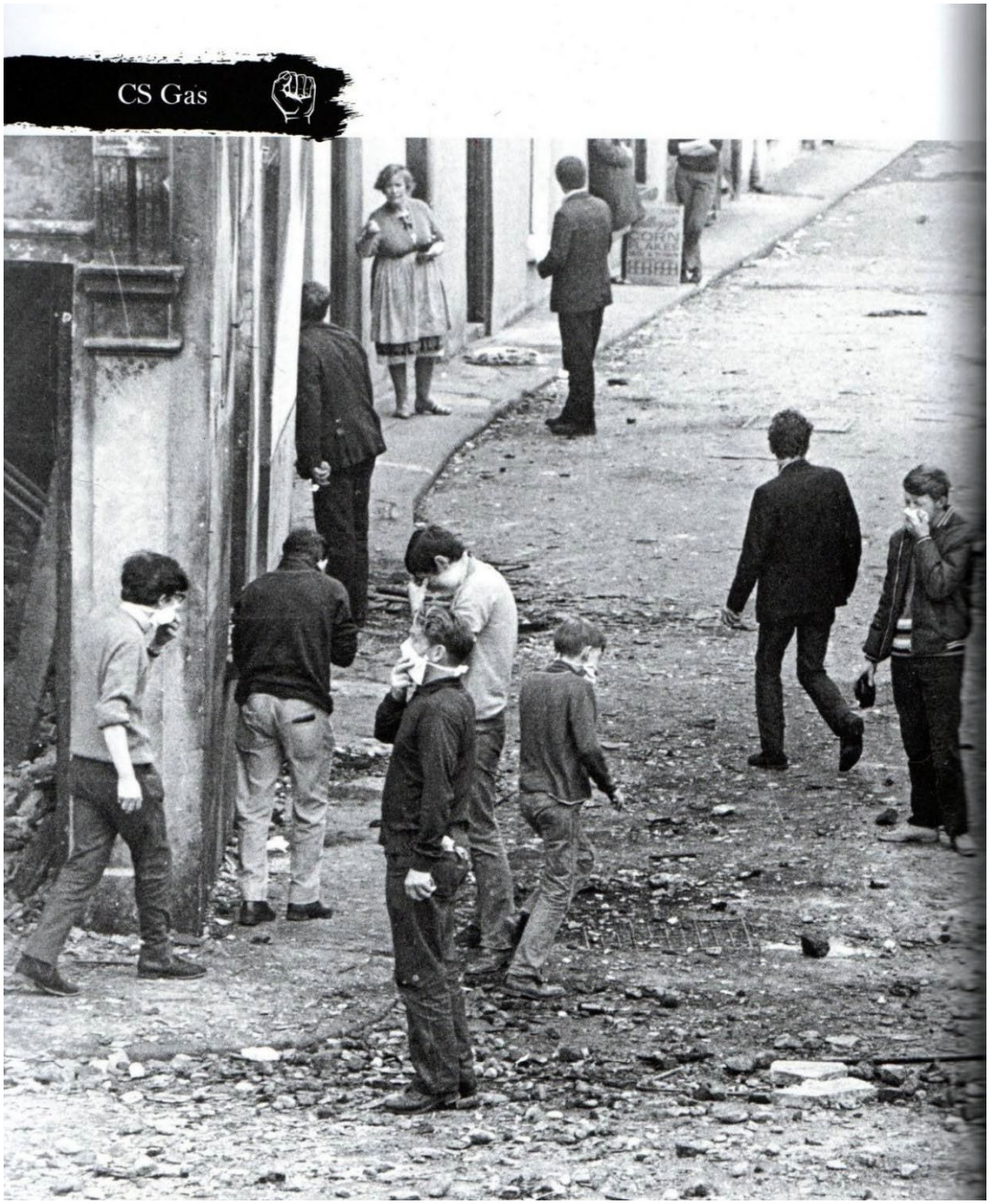

Image 5.3: Part one of a double-page spread of ‘CS Gas’-related photos © Limpkin, 1972: 50

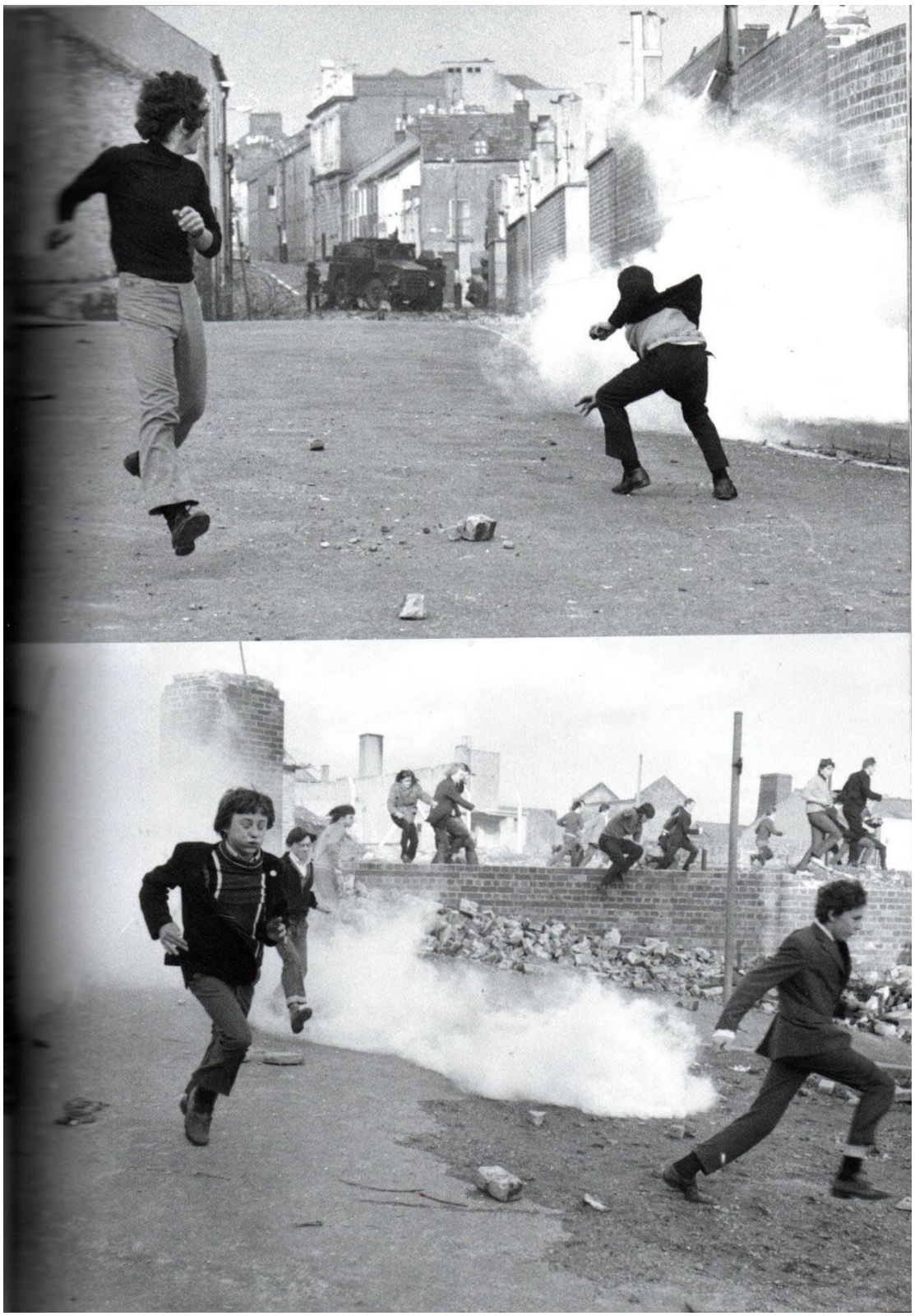

Image 5.4: part two of a double-page spread of ‘CS Gas’-related photos © Limpkin, 1972:51

The combination of both pages allows for an analysis of the ‘hot’ and ‘cold’ violence which was brought to Derry. They could be also constructed as subjective / objective, in the vein of Žižek’s (2009) reflections on violence. In the first, a street full

of people are engaged in their daily business. There is a board advertising corn flakes outside what appears to be a shop, and small groups of boys loosely wander around the streets. They do not seem to be in severe distress, though, as already noted, the kerchiefs around their faces speak to a lack of the ability to breathe clearly, again (assumedly) due to the release of CS gas which is detailed in the caption. Whilst not under direct threat, the figures in the first photo are still being affected by a form of violence – the invisible, 'objective' violence which "has a role in creating the conditions for subjective violence to occur and removing the necessary avenues that people would access to escape a violent situation (Quirk, 2018:11).

This all changes with the second page, composed of two images of subjective violence – direct acts of physical violence and terror which depart from the normal peaceful order of things (Žižek, 2009:2) (Zirnsak, 2019:3). All around the figures of the running boys, however, is the evidence of violence which has burnt hot, and is impacting on them bodily and immediately. Billowing clouds of tear gas blow backwards in the direction of the British Army 'pig' truck from whence it has assumedly been fired. With pictures that show, even for the split-second of the exposure, the atmospheric, violent occupation of Bogside which affected everyone, seeping under doors and in through windows to become an unconscious cough of oppression, there is also an angle which is not shown. There is no volume – in terms of dimension or noise, so we have to imagine for ourselves what the zooming, thudding and hissing of CS canisters would sound like raining down outside our home.

The motion and emotion captured tells us that the use of tear gas in Northern Ireland still troubled the affected residents of Bogside enough to send them running from the area. The repeated exposure that built up a trauma response would have also engendered the idea that lingering too long around CS-filled streets was unwise. The parallels between the background of the second (bottom) image shot by Limpkin and the photograph I have chosen as an example for McCullin are astounding – shot as if they were simply around the corner from each other with a different perspective.

5.2.4 Don McCullin / 'That's me in the picture'

For my next exploration of what photography – a captured image – can tell us about the experience of tear gas use, I am exploring a celebrated photo taken by Don

McCullin. Like Limpkin, McCullin was a photojournalist, though working for British broadsheets (The Observer and the Sunday Times) not tabloids. He is highly feted as one of the greatest photojournalists to have ever lived, knighted and with regular gallery retrospectives. The photo in question has been reproduced extensively, including by English post-punk band Killing Joke on their self-titled debut studio album (1980).

Image 5.5: Gang of boys escaping CS gas fired by British soldiers, Derry. © Don McCullin, 1971.

This image was utilised in a Guardian feature, connecting people in famous, iconic or otherwise well-known photos back to their experience of the event they are pictured in. Benn Keaveney, who was 14 when the photo was taken by Don McCullin, speaks about his experience that day: “Teargas is awful – it gets you in the back of your throat and burns your eyes. It drifts quickly, and even when you think it has disappeared, the wind then changes and it’s back. As soon as you see it coming, you run.” (Booth, 2018). The article, in combination with the photo which utilises chiaroscuro and silhouetting evocatively, paints a picture of fear and panic. The boys leap from a good height to avoid the clouds of CS which is starting to emerge from behind the wall – according to Keaveney, in a “burnt out sorting office in the Little Diamond area of Derry” (Booth, 2018).

It is helpful to my questioning to have the first two areas of my examination of each source already answered: the image shows us exactly what we are told – CS gas was fired at the group of boys, who fled over a wall, and the context has been filled in as well, with the addition of an extra comment that further enriches the sense of injustice that these boys were being subjected to CS gas in the first place: "there had been a riot, and I remember we were trying to help some older people get away" (Booth, 2018). So, the behaviour of the boys, from their perspective, was not inciteful, but pro-social – the CS gas deployment may well have been unwarranted, extra-judicial and violent for violence's sake. This tells us that tear gas is potentially utilised to achieve the breakdown of supportive, community behaviours and create a survival instinct akin to the 'fight, flight, freeze' reflexes (Taylor and Sachdev, 2022) of acute stress response. This is significant because it helps to conceptualise the ultimate aims of tear gas deployment and challenge the efficiency of a state-narrative that claims it maintains the capability to enforce dispersal of rioters only (in accordance with the international legal frameworks within which tear gas sits) – instead, it could be argued that CS is used as a behavioural management tool and a reinforcement of state (or sovereign) power.

McCullin was aware of the power of photography in generating visual postmemories, and in utilising his work to participate in processes of memorialisation. He said in an interview regarding his output "if I can haunt people with my pictures then I have done my job" (Kellaway, 2019). This desire to contribute to the phenomenological (re)imagining of conflict that he has photographed, particularly in Northern Ireland, brings to bear the concepts of haunting and those atmospheres of postmemory or affective memory (Anderson) where the boundaries between our actual experiences and the potential experiences of others are blurred. McCullin's images, along with others shared on platforms like Instagram "broaden participation in processes of memorialisation [but] they also lay bare the absence of a shared narrative on the violent past in 'post-conflict' societies such as Northern Ireland (Reilly, 2020).

Photojournalism was still justifiably important to share awareness and insight into events which were unfolding in Northern Ireland and in the immediate aftermath, though it later transpired that "photographers, who saw themselves and their medium as working to tell stories of injustice, instead found that their images were read to reinforce the actions the state and security forces had already taken (Hanna, 2015:457).

In particular, this was carried out through the Inquiry process, where documentary photography became evidence pored over by legal teams and yet documentary photographers were devoid of the agency to describe their art or correct any assumptions which had been made. Still, the process of Inquiries, particularly in Northern Ireland, sustained interest from the legal sphere in documentary photography and saw it begin "to establish a new societal place particularly for photojournalism, which has often been treated… as a 'throw away', temporary of habitual form" (Kennedy and Patrick., 2014:4).

5.2.5 Hands up, don't shoot

From photos of tear gas being targeted (largely) at Catholic Bogside residents in the photojournalism of McCullin and Limpkin, I wanted to expand this section on the iconic photographic representations of tear gas use to include two images taken during protests in Ferguson in 2014. This is another space / place of protest where "social media is being used to circulate images that illustrate the persistence of partisan, antagonistic forms of public memory" (Reilly, 2020) and these next two images exemplify this.

Firstly, gesture geopolitics in action in the form of hands, outstretched and empty, in a performance of surrender.

Image 5.6: Hands up, don't shoot © Scott Olson, 2014 / Getty Images

The image of a female protestor, on her knees surrounded by tear gas, with hands outstretched signalling her vulnerability is an interesting one to contemplate when considering gestures. Arms, raised straight above the head, signal surrender and openness in this example. Two arms raised straight above the head, at the same angle, when accompanied by chants at a football match – as happens regularly in all leagues by posturing individuals attempting to make themselves appear larger and more threatening - would signal the opposite. And one arm raised straight above the head, with palm facing the ground: that signifies one of the most hateful gestures of all time. In this case, using the gesture as pictured drew attention to the struggle of Black Americans, as Mike Brown had allegedly called out 'don't shoot' before being killed by a white Police Officer.

Focussing on the tear gas present in the photos allows for a short reflection on the associated harms it can cause: canisters do not just leach their smoky contents quietly but spew sparks and in some cases, flames. The clouds of smoke almost obscure the vehicles in the background, and given this particular protest is taking place on a road, could lead to serious consequences if it was in use. This image is not just an example of the power of a gesture, but of "atmospheric policing [which] refers to those technologies for controlling populations that are fundamentally predicated on their relationship with air" (Shaw, 2017:898) (Feigenbaum and Kanngieser, 2015:81).

Considering an example of where the bodies' relationship with air is being directly counteracted then, brings me to the last photograph of this chapter. Wearing an American flag, holding a bag of chips (crisps) and with locs flying, the photo of Edward Crawford returning a tear gas canister to police units in Ferguson became emblematic of Black resistance to over policing and the structural violence inherent in the everyday experience of being Black in America. "US policing in the 'Age of Ferguson' (Dickson, 2016) for example is directed most aggressively against Black populations. That is to say, militarised and pre-emptive forms of US policing overwhelmingly target what was first described as the 'American underclass' namely impoverished urban Black men (Mitchell, 2009)" (Shaw, 2017:899).

Image 5.7: Edward Crawford returns a tear gas canister fired by police who were trying to disperse protesters in Ferguson, Mo., on Aug. 13, 2014 © Cohen

The two photographs viewed together reveal something about the nature of tear gas exposure: it has the power to emphasise when struggle is overcome, as well as when it overwhelms. The second image shows a direct challenge to the deployment of CS in protest situations – what is deployed in one direction (towards a crowd) may just as easily be returned. As Adey writes "air has this knack of resisting intervention… the wind and the weather would intervene to blow the suspended cloud back to the Germans" (2014:125). That the challenge comes so flagrantly leads me to assert wryly that one of the logics of tear gas deployments is that you reap what you sow.

I believe there is much to learn about how tear gas featured in the experience of Bogsiders and the struggle for civil rights in Northern Ireland, and a rich vein of photography to utilise as source evidence of how CS was experienced. There were a further ten images by Limpkin which would have been worthy of examination as recordings of the deployments of tear gas, just as many more from McCullin amongst numerous photojournalists working at that time; amongst hundreds from protests in Ferguson and a litany of other cities in America, but regrettably little opportunity to dwell on it too much longer, as this chapter moves into considering the evidence which is captured in motion – enhancing our exploration of the evidence of tear gas use.

5.3 Video evidence

This next section of my chapter exploring the digital evidence of tear gas use will employ videography to show how tear gas has been experienced by a range of actors and subjects throughout history. There are examples from the archive as well as new broadcast media, linked in their portrayal and representation of tear gas use. I also use this section of the thesis to weave in vignettes regarding the experience of a number of colleagues or friends, having spent time during writing this section discussing it with them at length. The vignettes, however, are not "some magical ethnographic moment" (Hitchings and Latham, 2020:976) but a moment for me to have drawn both spheres of my professional and academic lives together, wishing to add an emotive, visceral and sometimes humorous context to the material of this chapter.

5.3.1 Ribemont Gas Training School

I returned to the Imperial War museum for this first section, though accessing their material through an excellent digital archive. I made the choice to include a video of military recruits training at the Ribemont Gas School in Ribecourt, Nord. The recruits were Australian, from the 5th Division (Gas School) so have a level of preparedness and anticipation already inherent from their prior training and duties. Similar gas training schools were established in Virginia, America, as well as in England, becoming the forerunner to the establishment of units like the Defence Chemical, Biological, Radiological and Nuclear Centre (DCBRNC) at Winterbourne Gunner, near Porton Down in Wiltshire.

The first video representation of the actual activity of tear gas preparations and mitigations struck me as essential viewing, showing the embodied reaction to the concept of a gas attack, translated into the muscle memory of a learned physical response that has become a core facet of any military and police training right through to the present day.

It is not on display at the IWM London but has been made visible through their website and archive, which provides an extensive opportunity to examine film and photography that might otherwise have been excluded from display in the public Galleries. The film detailing gas preparations is stunning in its similarities to

educational or training videos by militaries and police forces of today. The premise behind a need to prepare for the experience of gas persists in the training needs analysis of all UK police forces, who have at least adapted the format to the normalisation of CS gas use as a mechanism of police use of force.

Image 5.8: screenshot of Ribemont Gas School video © IWM 112 (1917)

The film, shown over two parts, show a group of soldiers carrying out tests of their gas masks, firstly in the open air and then in a room full of tear gas, as well as then when deployed into trenches and on patrols. There are several minutes of the dummy, dry-run instructions where soldiers don and remove their gas masks in near perfect drill timing, clean the eye pieces, and secure their small box respirators in their respective carry cases. The instructional, but acted, scene shows the precautions to be taken in a gas attack, including the use of a warning horn, fans to clear the bottom of trenches, and a blanket door. The second reel is a full acted gas attack including the actions of a fatigue party, demonstrating the effects of tear gas and what it could look, feel, and act like in a trench system. Smoke substitutes for gas in some segments of this video in the only indicator that this exercise is not being carried out at the very real peril of its participants. However, they do enter a chamber filled with tear gas on two occasions. Once the sentry gives the gas alert during the exercise, there is complete

compliance with the scenario, and it affords for all potential aspects of a reasonable worst-case scenario to be explored. When someone takes ill, becoming a casualty to the tear gas by way of a badly-fitting mask, a fatigue party responds and steps in to secure their safety, including by removing them to a gas-secure trench.

Image 5.9: screenshot of Ribemont Gas school video © IWM 112 (1917)

In the first video, which is 17:46 minutes long and shot in 1916, the assembled soldiers are subjected to tear gas deployment in order to test that their masks are fitted correctly, and that they are able to carry out basic drills which would promote their survival such as changing and fitting a new respirator, and addressing the needs of a casualty. This includes, in a moment of levity, the needs of a horse (above): who is suitably equipped with a respirator covering their nostrils and mouth and looks precisely as thrilled to be part of this exercise as the human participants do. Knowing how important certain animals were to the war effort, this video is a powerful and unique example of the capabilities which were developed to safeguard them as well as other combatants.

The innovations in mask-making were intended to act as a reassurance mechanism to those deployed to the Western Front, and the material embodiment of a

affect of security, in exactly the same manner as troops in training in most Western nations are exposed to CS in ‘confidence testing’ – to develop confidence in their own equipment as well as in the process of donning it.

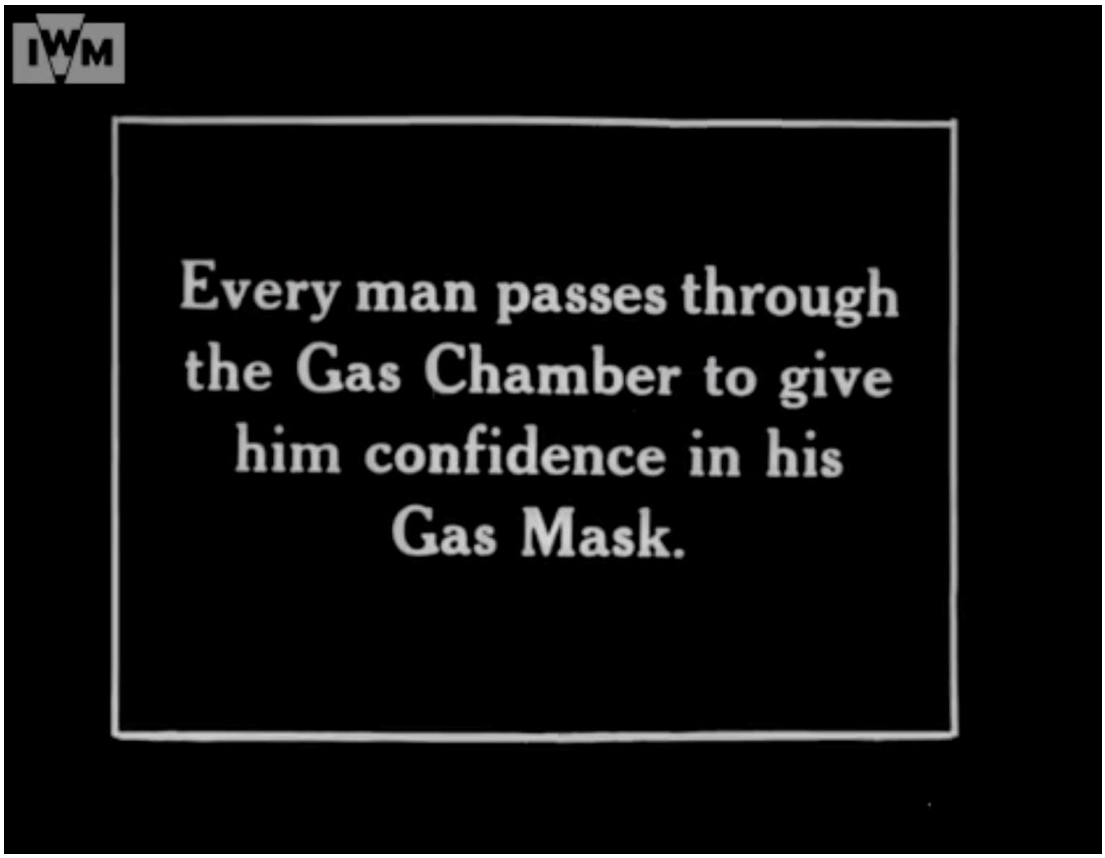

Image 5.10: Screenshot of Ribemont Gas School video © IWM 112

The soldiers demonstrate their competence at carrying out the drills, and a confidence in the equipment though enacting the experience of wearing, cleaning and removing gas masks, and begin to develop the muscle memory associated with prolonged exposure to a physiologically stressful situation by running at the double whilst still wearing those masks. They then move forward into a test, or ‘exercise’ element which consists of moving into a space clogged and thickly dangerous with tear gas, and representing the reasonable worst-case scenario that they would be likely to face when in the trenches or on the front line.

Exposure to the substance or ‘something’ that you are training to protect yourself from is essential in the kinds of experiential learning opportunity provided by both UK military and police forces today during their recruit and personal safety training - it is part of practice that participants will feel the effects of their CS or

equivalent, instilling confidence in their personal protective equipment whilst also outlining the severity of what they are being armed with. During this test, as per the interstitial caption (below) there is the first opportunity for some vicarious learning to occur – the participants are able to identify where their compatriot has made an error and amend their future behaviours accordingly. The man who rushes out is given the opportunity to re-enter the test, and in completing so, demonstrate that he has taken the lesson on board.

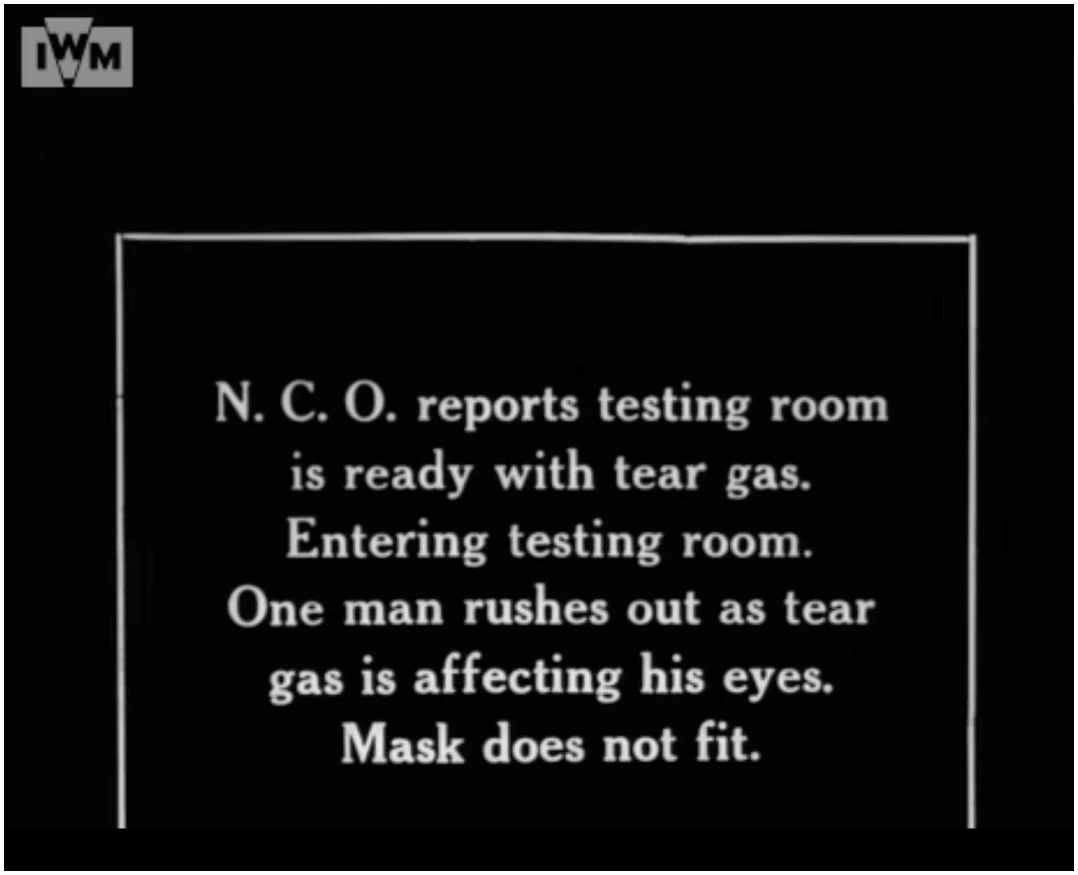

Image 5.11: screenshot of Ribemont Gas School video © IWM 112

Tear gas is shown to serve a purpose in facilitating anticipation and preparedness, by simulating an environment where no mistakes can be made, yet allowing for learning to be gained and the embodied experience of being in the cloud of tear gas to strengthen both confidence in, and competence with, key pieces of personal protective equipment. Further confidence is then demonstrated in supplementary pieces of requirement, where their Strobes warning horns are tested, alongside the Aryton fans which disperse the gas away from low-lying positions such as trenches.

This dichotomy identified through the wide range of sources in this chapter helps to breathe further life into the debate around tear gas's effectiveness and place within modern society.

Watching the Ribemont Gas Training School video drew, for me, immediate parallels with current police Chemical, Biological, Radiological and Nuclear (CBRN) training, of which I have both witnessed and been part of. Through rehearsal of a given scenario, designed to challenge participants to recall both mental and physiological drills and responses they have been taught in order to 'survive', the Ribemont School was a representation of the security atmosphere of Anderson, where presumption, precaution and preparedness buttress how our futures are anticipated.

Image 5.12: screenshot of Ribemont Gas School video © IWM 112

This was a significant moment for me in the course of this thesis, watching a gas training video which was nearly a hundred years old, thinking also of my job and role which has been shaped by the introduction of legislation such as the Civil Contingencies Act (2004). Now, police forces amongst other public sector organisations - though interestingly not the military, although they contribute heavily to UK resilience - have the duty to assess, plan, and advise, to train staff in the key

skills they will need in order to manage or mitigate the effects of an emergency, and a positive obligation to act under further legislative elements like the European Convention on Human Rights. The training of army recruits in the donning of their gas masks, and exposing them to tear gas as a means of building the embodied experience of emergency response, was instantly familiar to me as I watched it, mirroring a number of Hazardous Material (HAZMAT) or CBRN exercises which I had planned, directed, or participated in throughout the course of this thesis as part of my full-time employment.

Interpreting the video with one eye on the anticipatory, preparatory techniques that form part of my role in British Transport Police lent itself to an interesting viewpoint and perhaps one of the few times during this research where I have relied on a perspective outside of the academic geographical. In preparing for emergencies, the video represents an ideology of anticipatory action, showing the reasonable worst-case scenario and how it can be mitigated and managed. The intent is not that gas warfare, in particular the use of tear gas, can be entirely prevented from occurring, but that there is a space between its reckoning and its reality where preparatory drills can put people in the embodied experience of an attack with all the subconscious knowledge of their own safety. There is immense value in how the moving images represented a particular cleave in academic literature between atmospheres, affect and the future - but how it also drew on entirely new literatures of resilience, preparedness and afforded me a way into viewing material from the archive that was entirely resonant with practices that are quotidian.

Whilst this training video shows some distinct difference between how atmospheres of anticipation were created in the early 20th Century, it holds weight in many other aspects and actually presents an example of how tear gas use (CS in particular in the modern era) can be a useful tool to enhance the preparedness of persons in the police or military.

5.3.2 CS encounters in the context of training, testing and exercising

The Ribemont Gas School video was the source colleagues in the emergency services most connected with, when I discussed this thesis with them during informal moments over the last six years, and this examination provided a great opportunity for them to share some vignettes. One, who watched it and then reflected on his own

experience of being exposed to CS, saw the video as a visceral reminder of the experience of tear gas use. He said it brought back the sensation almost as clearly as it had been on the day of his exposure, when it felt like "thousands of tiny needles, where the crystals are lying on your eyelashes" (Colleague F, 2022). Some of the other vignettes shared by different colleagues provided context, as well as moments of comic absurdity, enrolling again the often unconventional or 'black' humour of the emergency services. I have included them this chapter, despite some of their tendency to hyperbolise, because they are representative of an authentic lived experience and add depth to what can be captured:

"First there is a slight burning and a tickle in your nose and your throat.
The burning worsens and starts to affect your eyes whereby the tears begin to flow like a small child watching Bambi's mum die.
You try to wipe your eyes, it makes it worse.
You then suffer auditory and visual exclusion and you have no idea what to do, where you are, or why your face feels like someone has set fire to it.
Later comes the mucus… the entire contents of your head basically falls from your nose, it's unstoppable, and you can't understand where it's all coming from.
You will basically do exactly what you're told because you want the mucus-filled nightmare to stop.
You stand in the fresh air and hope that it gets rid of the crystals of Satan which are invading your entire body.
It's fuckin [sic] *awful and there's nothing you can do about it!"* (Colleague U, 2023)

Another colleague picked up on a similar theme, comparing the overload of tears to another emotional moment from childhood that it was implicit that we collectively shared, when they described the sensation of being exposed to CS as *"a sensory overload of copious mucus production and an intense sinus and throat burning with the added bonus of a veritable flood of tears, as if watching E.T. (or Watership Down) for the very first time."* (Colleague B, 2023)

Considerations of the inequal perspectives of the exposure experience for differing genders were described when a colleague spoke about a near-miss in terms of sensations of pain and discomfort which continue well after the initial encounter with CS gas: *"I remember when we did it in the police and went back [to the residential*

block], the first few that went in the showers you started to hear "ahh don't touch your fucking cock boys!" (Colleague F, 2022)

Another colleague considered the notion of CS causing disembodiment to those who experience it, summarising the odd sensation as *"like having a very spicy curry but getting it in the wrong part of your face"* (Colleague S, 2023)

And finally, also ruminating on the theme of Indian food, tear gas exposure was described flippantly but unequivocally as *"an aerosol vindaloo"* (Colleague B, 2023).

These reflections provided the first opportunity for me to consider the perspective of those who are currently in a position to utilise tear gas (under very strict operational policies) and what their experience is, as well as what it tells me about the sensation of being exposed to tear gas. It reaffirms all of the visual, spoken, written and reflective evidence thus far – the experience of being subjected to tear gas is unpleasant, often longer-lasting than first thought, and unlikely to result in the fulsome appetite to experience the same sensations again in the immediate future, proving some of its value as a perceived tool of crowd dispersal. This helps to build up some of the counter-argument to debates regarding the value or necessity of the option of tear gas use in policing contemporarily.

5.3.3 Tear Gas and The Square

From the risk-assessed and tightly-controlled atmospheres of training, to the chaos and confusion of protest and violence on the streets. A voiceover speaks of the residual pain and discomfort created by tear-gassings occurring in Egypt, through a haunting monologue: "This is an army that has tortured civilians. On top of that, international governments, who I also hold complicit, have replenished the stocks of bullets that are being shot at people right now, of the tear gas that is clinging to my lungs." (The Square, Netflix, 2013). Rocks and rubble, picked up by protestors, are being banged on sheets of tin and other metals yet the sounds that they make are more reminiscent of the characteristic cracking of rifles firing in close quarters.

The Square (2013) is a documentary concerning the street-level view of

uprisings in Egypt which spans the Egyptian Revolution of 2011, where Hosni Mubarak was ousted, through the coup d'etat against Mohamed Morsi in 2013. Morsi was the first democratically elected President of Egypt but had been a former Muslim Brotherhood leader, keeping tensions between the group and the government swirling, with the later difficulty of military coups adding to the crisis and deposing of Morsi in turn, during a desperately unstable time for Egyptian citizens.

Winner of three Emmy Awards, of the Audience Award for World Cinema at the 2013 Sundance Film Festival and winner of the Kalba People's Choice Award at the 2013 Toronto International Film Festival, it packs a powerful punch. Key of interest to me when watching and engaging with this documentary was how it portrayed tear gas use, during multiple segments where the cast were filmed at barricades in the streets surrounding Tahrir Square, being fired upon with tear gas, rubber bullets, and all-too-often real ones too. In one scene, having just run through streets saturated with tear gas, we watch as Ahmed Hassan (one of the documentary's two male protagonists) sits down amidst rubble and litter with a large bottle of Coca Cola. He deliberately shakes it to generate fizz, and uses the bubbles which bursts forth to wash his face in a routine faintly reminiscent of wudu (the Islamic practice of ritual ablution before prayers). He looked pained before he sat down, with reddened eyes and tear tracks visible on his face, but the Coke appears to bring some respite. It is from this I come to recognize the importance of networked protest movements who share information such as what materials to use to counteract the effects of tear gas (never water – Coke or milk work fine. If you must shower later, cold showers only), and the significance of the 'disobedient objects' of our last chapter. Here is the video evidence of the subversion of those formalised processes of decontamination which police and military personnel exercise for: the nature of drills at places like the Ribemont Gas School are invalidated by Coke. The tear gas has no lingering effect on Hassan, for he returns to the protest almost immediately.

Even though the mention of tear gas was infrequent in The Square, its presence could be felt through the filmography which was frequently blurry, as if operating through a thick, impermeable cloud. Outside of the portrayal of the effects of tear gas in temporarily disrupting protest by dispersing its participants, the documentary did exemplify some of the biopolitical literature relating to "atmospheric enclosure" (Shaw, 2017:987) and "the ecology of state power" (Philo, 1992) and how it acts

through the mechanisms of militarised and hostile atmospheres. The overriding message, however, is that frequent CS use failed to disrupt protests or disperse protestors in Egypt for any significant amount of time; after Tahrir Square was emptied, it would fill right back up again.

5.4 Speaking words of wisdom – audio evidence

This next section of this chapter I will explore the oral history which is testimony of experiences with tear gas. The Imperial War Museum again provided the digital archive space which I was able to access recordings from ordinary men and women as part of the Oral Histories project. A number of them pertained to tear gas use and their experiences, from which I have extracted three which all pertain to a different nature of experience, transcribed them, and have analysed them in this section. Whilst the recollections may have been embellished with the benefit of age, I consider them to absolutely be an element of tear gas experience which is 'captured' by recording, rather than being 'created' as an artistic exploration. These digital recordings of sounds and scenes (if poetry and painting could be possibly termed analogue for the purposes of this comparison) are part of the greater patchwork of identifying, and then experiencing the experience of tear gas use, allowing for viewers and listeners to engage with the retelling of experiences utilising media that may be encountered more informally than museums and sites of memory.

5.4.1 Fearing gas

A healthy fear of gas warfare was enforced in adults and children alike. The first participant in the IWM Oral Histories project that I examined delivers an anecdote about how that fear was consciously reinforced through testing, which exposed who would be vulnerable to a gas attack.

> "We came out of school and just up the road by Coopersons Corner, they let off live tear gas bombs! They tested tear gas on children and teachers because no one had been keeping their gas masks and respirators with them!
> It's not pleasant, I tell you, tear gas isn't." (Downes, 2013) © IWM 34112

The anecdote is reminiscent of the Gas School video and its anticipatory atmospheres of emergency, yet infused with the harrowing realisation that children were not only

part of these spaces of tear gas exercising too, but actively targeted by them.

5.4.2 Frustrating gas

The next anecdote from the Oral Histories recording concerns how tear gas was primarily a frustration, particularly in trench warfare. Not lethal enough to warrant wearing a gas mask for, it was therefore something which became part of the daily experience of navigating life in the trenches.

> "The only gas that we were bothered with was tear gas - we had plenty of that bothering us. In the land behind the front trenches where there were communication trenches and workers, it would be drenched in tear gas. With tear gas you couldn't see properly. You'd just have to put up with it. We didn't bother with our gas masks for that." (Thompson, 1986) © IWM 9549

5.4.3 Funny gas

Our final reflection shows that on balance, tear gas did not represent a significant harm, and could be used as a medium for exacting pranks and frustrating senior officers in the military.

> "We were set about cleaning the NAAFI ahead of the Company Commanders inspection after a gas training attack… We realised that our beautifully clean NAAFI was going to be invaded by the Company Commanders and other officers, so we chucked a couple of used canisters onto the NAAFI fire so that it filled it with tear gas. I was sent up for a telling-off!" (Parrett, 1995) © IWM 16279

5.5 Conclusion

Throughout this exploration of the recordings of tear gas use, the witness testimonies and the unimpeachable truths of photojournalism and video recording, I found it key to keep referring back to my central research question and utilising it to formulate an argument. The point of examining the evidence which is captured regarding tear gas use or experience is to seek authenticity, for the camera does not lie. In the examples which I have woven together, however, the duality of tear gas begins

to emerge, with the experience of tear gas use in this chapter leading to the preternatural (re)imagination of tear gas as both an agent of destruction, and as an agent of construction. This will be tested as the next chapter moves us into more phenomenological reflections, drawn from the understandings of tear gas which are not evidential but emotional.

6 Things we create: paintings, poems, and murals of tear gas use

"Before tear gas was an instrument of the police, it was an instrument of war" (Grush, 2020)

6.1 Introduction

This chapter deals with the examples of representative experience that have been found from artistic expressions and interpretations of the use of tear gas. It spans mediums from paintings and murals, with cartoons, poetry and prose feeding into the swirl of visual and textual representations of tear gas use and its effects that I will examine, juxtapose, and link. The thread of this chapter picks up from our previous exploration of representations of tear gas use where motion and emotion are captured, and makes the distinction that what can be captured - as per the last chapter - is different to what can be created, requiring a differing lens, approach, stylistic interpretation and process of editing that may take us away from a directly recorded, 'real' experience. This is not to diminish the creative lens, however, as a collation of the artistic interpretations of tear gas use have value in telling us not what it was like, but what it felt like to those who were affected by it. Grouping the recollections and remembrances of tear gas in this manner has shaped the identity of each chapter's methodological approach too, allowing for subtle variation in the guises by which the subject was approached.

This chapter, also like those previous, moves through examples from three distinct time periods of reaction to tear gas use: World War I and the inter-war years in Western Europe and America, the late 1960s - early 1970s of 'The Troubles' in Northern Ireland, and the 2010s to 2020s, a period of uprising and protest across the United States of America. By textual analysis of how words that make up poetry constitute signals, those scribbles of situational representation start to build a picture of the reflexive experience of tear gas use. The reality of experience might be visible through photography or videography captured in the moment, but paintings craft a new and different reality through brush and awe, mixing reaction with their reflections.

How these mediums contribute to an unfolding of tear gas use, and to the reader or viewer "experiencing the experience" is still a primary concern with the data collected, sorted and analysed in this chapter. Whether this takes the form of a vignette

from the moment of discovery, or a 'trace' that may only have emerged after all sources were known and had been woven together will vary by example, the thread of analysis of how the materiality and method of how tear gas is memorialised will run throughout. I wanted to consider both the agency of tear gas as the subject of most of these artistic renderings, but also of the media themselves and how their agency, their "potential to make a difference, such that it comes to be envisaged as something that can be distributed across both the social and the material, the human and non-human (McFarlane 2011)" (Waterton and Dittmer, 2014:6) is brought into focus.

6.1.1 Data sources in this chapter

As with our previous chapters, a list of examples which have formed the foundation of data for this chapter can be found below:

Title	Date / era	Type of source	Creator
Rhyfel	WWI	Poem	Hedd Wyn
Dulce et Decorum Est	WWI	Poem	Wilfred Owen
War Gases for Children	WWII	Poem	Anonymous
Gas identification card	WWII	Cartoon	US Army Special Services
Gassed	WWI	Painting	John Singer Sargent
The Runner	The Troubles	Mural	The Bogside Artists
The Petrol Bomber	The Troubles	Mural	The Bogside Artists
The Rioter / Saturday matinee	The Troubles	Mural	The Bogside Artists
Bogside	The Troubles	Poem	Seamus Heaney
Not An Elegy For Mike Brown	2010s - 2020s	Poem	Danez Smith
We Called It A War Because It Was Useful, or alternative names for tear gas	2010s - 2020s	Poem	Jacqui Germain

Table 6.1: sources in Chapter 6: things we create

Whilst this chapter may seem poetry-heavy, it is balanced in terms of the eras from which the sources emerge, with a variety of reflections from World War I, The Troubles, and contemporary occurrences. The eras shape our exploration of what is created when reflecting on tear gas use, with an early reflection that the tones of disbelief, sadness and anger percolate all periods examined in this chapter, though we will still see humour poking through in places. As with previous chapters, we begin this exploration by going to the source furthest back in time first, though will move occasionally around in our examples dependent on the media form that they take. In addition, a number of sources date from during World War II (WWII), which has previously been unexplored by this thesis. The assertion that it was not a gas war is demonstrably false, of course; "many people are under the misapprehension that while chemical weapons were used frequently in the First World War, they were not used in the Second World War; " chemical weapons killed about 90,000 people in World War I and 350,000 in World War II, plus the victims of Nazi gas chambers (Russell, 2003:1). The chemical weapon of choice in the First World War was poison gas, but in the Second it was incendiary bombs" (Doel, 2017:135.) Still, the sources in this chapter from WWII speak of poison and tear gases, mixing the scientific descriptions of their smells, appearances and capabilities in with a jingoistic poem in the style of a slogan, designed to stay and play around in the mind.

6.2 Poetry and tear gas use

This first section will account for the creative reflections of tear gas use which are presented in the form of poetry. A practiced and measurable art form, with rules about rhyme, alliteration, assonance, syllable count and stanza length; some of the poetic examples in this chapter are just as technical as the design of an exhibit or the curation of an artefact in our first empirical chapter. There is an argument, that given how fiercely elements of the curated (museums, exhibits) can be contested and reimagined, that in praxis they are less evidential than creative writing styles utilising metaphor. Recent examination of the museum space in Belfast noted how shaped and mediated the exhibitions concerning the Troubles were by lingering influences aligned to either nationalism or republicanism (Mathuria, 2024) and that

This section will span the same three eras which have been my focus for data collection in previous chapters, visiting recollections from WWI, The Troubles and the 2010s - 2020s in turn, in order to build up the sense of what poems and poets can tell

us about the experience of tear gas use.

6.2.1 War of words - war poems and gas

Recollections of the horrors of World War I brought gas swirling into public consciousness when they were released for mass consumption as poetry, prose and art during the post-war period. Accounts of the bleak realities of war were popularised by a collective reaction to the lifting of censorship and control which had been exerted over journalists as well as soldiers due in part to legislation such as the Defence of the Realm Act - enacted four days after hostilities began in 1914 by a government desperate to stifle criticism of the war effort (Greenslade, 2014). Further creative interpretations, such as poems and paintings, were almost certainly a reaction to the censorship and attitudes of the state during hostilities.

Demonstrable contempt for journalists was pervasive in what has been termed the post-war 'literature of correction' (Luckhurst, 2016) by British and French soldiers, who found "their [journalists] behaviours hard to forgive" (Luckhurst, 2016). Throughout the war, "many newspapers in Britain, France and America were content to behave as patriotic propagandists … War correspondents downplayed misery and extolled victory." (Luckhurst, 2016) When confronted with the scale of the inaccuracy of war reporting, a natural reaction to this by soldiers was to produce their own trench materials - newspapers like 'The Wipers Times' were a channel for the anger and frustration felt by those who had experienced a very different conflict to the sanitised accounts of British national newspapers, or the French equivalents *Le Rire aux Eclats*, *Le Poilu*, and *Le Crapouillot* which created what had become known by that point as 'the patriotic lie' (Ferenczi quoted in Quinn, 2012:57). Returning to the Home Front which had been fed a narrative of the heroic nature of war, rather than the unfathomable slaughter of it, prompted the interpretation that war poetry such as 'Fight to a Finish' (Sassoon, 1917) was a fantasy about "soldiers returning from the War running through the grunting and squealing 'Yellow Pressmen' with their bayonets" (Lonsdale, 2011:326). This is not to say, however, that all war poetry was about infinite horrors and exacting revenge on everyone from the Bosch to the newspaper editors of the time; some war poetry told other human stories of love and change, or even a viewpoint contrary to the narrative such as Edward Thomas's in 'This is no petty case of right and wrong', where he doesn't outline any hatred for the Germans, merely a refusal to "grow hot / with love of Englishmen, to please newspapers" (Thomas, 1916). But we are

getting ahead of ourselves - before the poems were etched into public awareness and anthologised for future generations, or the paintings hung in major galleries, they were raw, source material, based on the experience of a gas attack or gas use by a small group of men dotted around unremarkable fields in Northern Europe.

6.2.2 Humour versus horror in war poetry

In the war poetry engaged with for this chapter, bullets zip past razor wire, shells drill a new geography of the hillsides, trenches are thick and slow with mud, the urgency of sirens and shouts clogs the air and helmets lay wasted, sprouting flowers. But what of tear gas? Evidence of the early use of tear gases and the development of war gases emerges in poetic scenes where "an ecstasy of fumbling" (Owen, 1921) led to the conceptualising of the affective atmosphere of gas use as a terrible, panicky, hopeless place and time - where "atmospheres exceed any individual body they emanate from and in this excess are capable of structuring spatiotemporal arrangements" (Leff, 2021:1) and ensuring that its use could not be easily forgotten. Indeed, it is gas use in WWI that gives us some of the most memorable artefacts and artistic representations of the horrors among reality that both lines experienced - with war poetry taking a central role in the generation of affective atmospheres. This is juxtaposed with the humourous approaches which emerged contemporaneously to war poetry and prose, in the form of trench newspapers, theatrical productions and short stories. The existence of a counter-perspective to some of the most solemn and cerebral interpretations of warfare in the form of humour "creates [a] nuanced and moving picture of war experience, capturing diverse aspects of wartime life" (Anderson, 2019: iii). That humour persists in the worst circumstances is testament to the human condition and how coping mechanisms to trauma have been developed.

Maudlin poetic retelling of the horrors of war were not the only mechanism for vicarious retelling of the trench experience, however. Humour was dominant and pervasive, fulfilling a vital role as a mechanism for coping and processing what was being experienced. This was obvious through the proliferation of parody - particularly in relation to orders. The military lives off orders: orders dictate the life and livelihood of military personnel. Yet they are frequently subverted or parodied and during World War I these dis-orders grew in prominence. Anderson asserts that parodies of orders belong to Bergsonian humour, "directed against the individual who is singled out for behaving in an inflexible way" (Bergson, 1914:20 quoted in Anderson, 2019:96) and

where the perception dominates that such inflexibility is absurd.

Absurdist interpretations of military orders, however, bore some resemblance to the real thing. In Mudhook, a trench magazine, the order came that "subsequent to a gas attack, clothes are to be taken off and beaten before the gas mask is removed" (Mudhook, 1917) accompanied by a cartoon of a soldier, nude except for a gas mask. Stranger than fiction, however, was the instruction that Brigadier General James harboured made "when a man is close to the burst of a gas wheel his clothes may become contaminated … where possible the clothes will be removed" (Harbord, 1917:10). Conceptually, battalions of nude soldiers crawling about under a sea of gas to save the contamination of pieces of clothing was a clear source for trench humour and the parody, showing how humour was an approach frequently utilised to dispel tension and react against what was perceived as invalid or egregious commands.

Two humourous poetic interpretations of the need for people to be aware of war gases have been included in this section. First to explore is a poem, or rhyming cautionary tale charting a number of war gases, taught to children to enhance their ability to identify threats and risk, and increase the chances of maintaining their personal safety. It was also issued in printed form, distributed by ARP Wardens, appearing in local newspapers and other circulars - in short, this was an exercise in collective awareness-raising via the medium of poetry.

6.2.3 Beware of the Gas!

If you get a choking feeling and a smell of musty hay
You can bet your bottom dollar that there's PHOSGENE on the way
But the smell of bleaching powder will inevitably mean
That the enemy you're meeting is a gas we call CHLORINE.
When your eyes begin a twitching and for tears you cannot see
It's not the mother peeling onions, but a dose of CAP.
If the smell resembles Pear Drops then you'd better not delay;
It's not father sucking toffee, it's that ruddy KSK.
If you catch a pungent odour as you're going home to tea
You can safely put your shirt on it they're using BBC.
DM, DA and DC emanate the scent of roses,
But despite their pretty perfume they aren't good for human noses.
For it's MUSTARD GAS, the hellish stuff that leaves you one big blister,
And in hospital you'll need the kind attention of the sister.
And, lastly, while geraniums look pleasant in a bed,
Beware this smell in wartime. If it's LEWISITE you're dead.

(Dart, 2005)

With regards to tear gases, the poem identifies a number of compounds which were in use during the Interwar period, and extant as a capability for militaries in WWI. These included BBC (Bromobenzyl Cyanide), CAP (Chloroacetophenone) and KSK (Ethyl Iodoacetate) as the forerunners of the 'C' agents which became understood as tear gases in the latter half of the 20th Century. The 'D' agents mentioned by the poem were all vomiting agents; less potent than mustard, phosgene or chlorine but still harassing and deleterious enough to induce illness.

This poem was all part of a landscape of anticipatory natures, aided by the collective citizen participation in acts of 'civil defence' including the evacuation of children from major cities to the countryside (Jackson, 2023), and the construction and use of air-raid shelters and nightly 'blackouts' (Wiggam, 2018). Similar civil defence structures such as the Auxiliary Fire Service, War Reserve Police and Air Raid Patrol wardens all rose to prominence during this time and aided in extending 'the threshold of the state' (Greenhalgh, 2017) through the 1940s and into the 1950s.

A very similar interpretation, also using rhyming verse to characterise a number of war gases and tear gas, was circulating in the United States of America during the same time period, courtesy of the US Army Special Services Division.

Image 6.1: Gas cartoon © US Army Special Services Division, 1943

The cartoon helped to popularise the detail of gas identification amongst soldiers, mainly through outlying which smells would be an indicator of which chemical. (N.B the final panel has a scanning error and should read: “That ain’t flit you’ve chanced to sniff - it’s chloropicrin [an asphyxiating agent] one small whiff”) Using discourse analysis to interpret the fine line drawn between the affective atmospheres of tear gas use, implying fear and vulnerability found in some of the poetic examples with the humourous and yet informative cartoons, rhymes and training aids shows the range of how tear gas can be impactful dependent on the audience, circumstance and construction. Both however, whether accurate, authentic or allegorical, speak about the harms which tear gas is responsible for in a multitude of ways, aligning to the aims of this research to understand and represent the experience of tear gas use. Both the poem and the poetic cartoon help to share an awareness of the effects of tear gas, but in placing it in the same context as those war gases which require serious mitigation to reduce the risks of fatal or life-changing injury, tear gas does not compare. What the sources do share effectively is how widespread the fear of gas was. “The experience of the war led to a sort of collective national trauma afterwards for all the participating countries … this social trauma manifested itself in many different ways” (Zapotoczny, 2007:9)

6.2.4 The environment in war poetry

Returning to our WWI poets, Wilfred Owen’s work ‘Exposure’ speaks of the explication of the environment in the lines “sudden successive flights of bullets streak the silence / less deadly than the air that shudders” (Owen, 1921). Rain, wind and air all conspire in the poetic imagery to give notions of these new weapons that take advantage of naturally occurring phenomena to cause new destructions. Hedd Wyn concludes ‘War’ with “*A gwaedd y bechgyn lond y gwynt, A’u gwaed yn gymysg efo’r glaw*” (Ballads of boys blow on the wind / their blood is mingled with the rain) (Evans, 1918). Evocative use of weather, climate and terrain speak to the geographies of war, and how they were both victim to and weapon of destruction.

In 1914, “a generation of innocent young men, their heads full of high abstractions … went off to war” (Hynes, 1990:xi) taking with them - at least for the officer class who were able to retain a number of personal possessions, as well as the capacity to be resupplied - all the paper and ink they needed to record their experience of the war through the classical imagery of glory and heroics that was familiar to them.

This conceptualisation of where war poetry came from is reductive at best, assuming that war poets were a homogenous group (refined and defined as officers) and is rejected as an "old paradigm" of "critical orthodoxy" (Vandiver, 2010:2) though does at least allow a glimpse at notable stereotypes at play with what became a far more diverse and divergent medium for recording the experience of tear gas use amongst the other collective horrors of war.

This section of the chapter will examine poetic interpretations of tear gas use from a number of sources, utilising textual analysis to interpret what each tells us about how tear gas use affected them, and what can be extrapolated regarding the nature of the experience of tear gas use.

Our first poet at least satisfies some elements of the Hynes stereotype - this archetype of the war poet as disillusioned young male engaged in an activity of which they had no way out, unable to return to writing Homeric treaties on glorious antics or the halcyon days of their schooling and adventures, and embittered enough into crafting anti-war imagery. Wilfred Edward Salter Owen was a second lieutenant, commissioned into the Manchester Regiment in 1916. His promotion to lieutenant was posthumous, so for two years he oversaw a company of men billeted at locations throughout Northern France, and for some time on the front line he was engaged in precursor battles to the Somme offensive. One of his most notable works is Dulce et Decorum Est, written in 1917 and appearing in a letter to Owen's mother under the note "here is a gas poem, done yesterday" (Owen, 1917). By witnessing the experience of tear gas use, Owen was able to authentically and effectively act as a witness to its horror, translating that into metaphor and allegory but without compromising the authenticity of his reaction. When concerned with how tear gas use is represented to those who will not directly perceive it, but engage with tear gas through its intermediation, the impact of this poem for the acts of vicarious witnessing is profoundly significant. The full poem is presented below.

6.2.5 Dulce et decorum est

Bent double, like old beggars under sacks,
Knock-kneed, coughing like hags, we cursed through sludge,
Till on the haunting flares we turned our backs,
And towards our distant rest began to trudge.
Men marched asleep. Many had lost their boots,
But limped on, blood-shod. All went lame; all blind;

Drunk with fatigue; deaf even to the hoots
Of gas-shells dropping softly behind.

Gas! GAS! Quick, boys!—An ecstasy of fumbling
Fitting the clumsy helmets just in time,
But someone still was yelling out and stumbling
And flound'ring like a man in fire or lime.—
Dim through the misty panes and thick green light,
As under a green sea, I saw him drowning.

In all my dreams before my helpless sight
He plunges at me, guttering, choking, drowning.

If in some smothering dreams, you too could pace
Behind the wagon that we flung him in,
And watch the white eyes writhing in his face,
His hanging face, like a devil's sick of sin,
If you could hear, at every jolt, the blood
Come gargling from the froth-corrupted lungs,
Obscene as cancer,
Bitter as the cud
Of vile, incurable sores on innocent tongues,–
My friend, you would not tell with such high zest
To children ardent for some desperate glory,
The old Lie: Dulce et decorum est
Pro patria mori.

(Owen, 1917)

The poem allows us to take part in an exploration of the atmospheres it evokes with emotive and visceral language which forms the method for articulating the relationship between the body and its environment (inside out) and the environment onto a body (outside in), though whilst considering the poem as an emotional reaction to the witnessing of gas use, and therefore a source of comment on its traumatic and enduring impact, it is also important to consider the role of the poet as witness – and how just because rhyme and metaphor are present, the value of the poem as a source of evidence still remains even though prose would seem more familiar to a researcher wishing to gain the sense of an accurate account of gas use. There is inherent value in utilising the poem as a one of the truest reflections of experience – particularly in an autobiographical work such as Owen's with the contextual knowledge that he experienced gassing first-hand rather than writing it through mediated reports. Subjecting the poem to textual analysis, with a concerted effort not to diminish its status as both evidential and emotional reflection, it is possible to draw as much meaning on concepts of memorialisation as the curated, designed, influenced and

subjective museum spaces aim to portray – standing the poem in contradiction to what may wish to be seen as the most accurate evidential source (the exhibit) by virtue of its authenticity as a source of vicarious witnessing.

The first and second stanzas speak of the gas attacks most directly, evoking traumatic imaginings of the weakening of the men - they are ‘lame’, ‘blind’, ‘drunk’ and ‘deaf'. The poem shows a grim and disbelieving account of the horrors of gas warfare, particularly pertaining to how it wreaked its environmental effects - ‘as under a green sea’ and with words conjuring up the imagination of a thick and stifling cloud which is moving ever closer to affecting the narrator too - ‘dim through the misty panes’ and ‘smothering dreams’. The use of metaphors of pain and discomfort ‘bitter as the cud’ enliven a sense of disembodiment, that the author is no longer in control of their own life-ness or atmosphere.

6.2.6. Casualty

PARAS THIRTEEN, the walls said,
BOGSIDE NIL. That Wednesday
Everyone held
His breath and trembled.

(Heaney, 1998)

The poem that I have chosen to represent a data source on the use of tear gas in Northern Ireland doesn’t explicitly speak of the subject, but is still representative of the claustrophobic, uncertain and opaque feeling of gas. In just one stanza, the sense of foreboding is most apparent. There is a sense that the resilience of the community has been completely destroyed and the unmistakable violence associated with Bloody Sunday has caused a collective fear - the trembling as both a bodily and emotional reaction.

On the poetry of witness, Forché and Wu promote the idea that poetry can be “composed at an extreme of human endurance” such as being on the brink of death, and “bear witness to historical events and the irresistibility of their impact” (2014). For Heaney, the bearing of witness includes the moment of collective pause, where the visceral pain of the loss of thirteen community members contributed to an atmosphere almost too stifling to take a breath in.

6.2.7 Not an Elegy for Mike Brown

I am sick of writing this poem
but bring the boy. his new name
his same old body. ordinary, black
dead thing. bring him & we will mourn
until we forget what we are mourning
& isn't that what being black is about?
not the joy of it, but the feeling
you get when you are looking
at your child, turn your head,
then, poof, no more child.
that feeling. that's black.
\\
think: once, a white girl
was kidnapped & that's the Trojan war.
later, up the block, Troy got shot
& that was Tuesday. are we not worthy
of a city of ash? of 1000 ships
launched because we are missed?
always, something deserves to be burned.
it's never the right thing now a days.
I demand a war to bring the dead boy back
no matter what his name is this time.
I at least demand a song. a song will do just fine.
\\
look at what the lord has made.
above Missouri, sweet smoke.

(Smith, 2014)

Although the poem doesn't reference tear gas explicitly, instead referring to 'sweet smoke' above Missouri, where the streets 'deserve(d) to be burned', it was shared extensively in the immediate aftermath of Michael Brown's death in 2014 and the nights of tear-gas fuelled protesting that followed. The poem achieved virality, being picked up by media corporations such as Buzzfeed, which published the poem in its entirety alongside imagery including the 'Hands up, don't shoot' photo which has circulated as an evocative example of the role of tear gas in protest in the previous chapter. This combination of the evidence which has been captured regarding the Ferguson protests in previous chapters, and the immediacy of a creative reflection on the political conditions under which it transpired through the poems below makes for a poignant reflection on the protests, either when viewed together or as the sum of their parts.

6.2.8 We called it a 'war' because it was useful, or alternative names for tear gas (after Danez Smith)

1. blossoming poison
2. forced abandon (before the handkerchiefs)
3. coward's fire
4. what came without warning, at first
5. the only indictment for miles
6. what came after a warning, eventually
7. America's presumed mercy—which of course dissipates in the wind, which of course is a choking gratitude in the void of massacre, which of course is our most humble foreign policy
8. nightly ghost brand
9. perfume of the streets
10. measured plague and almost certainly someone's evidence of god
11. permissible burning
12. summer baptism at the curb's alter, anointed before heaven & hell & everything in between
13. an extended metaphor
14. front line testimony & bastard badge
15. not water hoses (yet/anymore) at least—which is almost certainly a kind of progress, no?

(Germain, 2016)

There are parallels between '*Dulce et Decorum Est'* and '*We called it a 'war' because it was useful, or alternative names for tear gas (After Danez Smith)'*, firstly in the use of descriptive imagery regarding bodily functions. The agency and power of gas is enrolled in causing the poets to choke, thinking of the instant physiological reactions to being exposed. They invoke the allegory of the devil '*sick of sin'* (Owen, 1917) and being caught between heaven and hell, in an examination of the absence of mercy available, which contributes to the pressing sense of loss.

The thematic undercurrent of the four poems is one of mourning and committing to memory that sense of loss, whether in terms of power, agency, personhood or community. The poems were selected because they speak to the varying ways in which tear gas use can linger in the after-effects of traumatic encounters with militaries or policing agencies, but also in the environment. Other environmental references - 'a city of ash' / 'sweet smoke' in Smith (2014) connect back to the literature on atmospheres and how affective grieving might emerge or "emanate from, but exceed the assembling of bodies" (Anderson, 2009:77).

Ultimately, outside of the direct references to the chemical compositions of tear gases in poems designed for awareness-raising and the sharing of biopolitical propaganda, there are few direct mentions of tear gas use in poetry that contribute to a significant growth in our understanding of how the experience of its deployment may be remembered or retold, however those mentions where they do occur are authentic and constitute just as legitimate a source of vicarious witnessing as some of the state-sponsored or aligned archives and spaces of commemoration, or the captured evidence through audio, video and photography. This is, however, not evidence of some sort of shift in the medium of expression - poetry is not dead, even if it may be fashionable to assert so (Griggs, 2015). However, there are more opportunities to examine the reflective experience of tear gas use as we move into drawing out other artistic representations.

6.3 Artistic renderings of tear gas

In this section of my final chapter exploring the artistic representations of tear gas use, I will examine a number of paintings and mural which have attempted to communicate the evocative experience of tear gas deployments. I will make comparisons to the previous chapter as well, to some of the photography which appeared there, whilst setting out the difference between what can be captured with the click of a shutter button, versus the forms of art in this section which are subject to design criteria, imagination, and can be reviewed as they live rather than remaining as the flat ontology of the events experienced.

In this chapter alone, artwork - both on a conventional canvas and at scale in the urban environment - poetry and cartoons have all shown glimpses or little revealing traces of how it is interpreted and reimagined. A number of paintings or murals are similar in nature, showing the human subject navigating around the clouds of CS, or in the case of Gassed (1917), embodying the consequences of being in the cloud, always represented as billowing white smoke. There are further similarities between poems written during a World War, and during what some commentators have said amounts to a civil war in America. Words invoking battles, enemies, and the perilous nature of gas use as an occupation force emerged when I looked at poems by Wilfred Owen and Danez Smith. The language used to characterise gases: ‘incurable cancer ’/ or ‘measured plague’ shows the rhetoric of sickness and affliction, which is further unfolded by the journey of the poets into the exploration of death, and allegories of

religion through exploring heaven, hell and earth.

6.3.1 Drowning in the air

In our first example of an artistic representation of was gases depicting the use of tear gas alongside other more noxious nerve or asphyxiating agents, I visited the Imperial War Museum in Lambeth which hosts Gassed - a fatalistic epic of a painting with striking similarities to the line of tear-gassed British soldiers in Bethune pictured in Chapter 5. Gassed was painted in 1919 by John Singer Sargent, who had been commissioned by the IWM in its infancy to contribute the central painting for the Hall of Remembrance, a large undertaking in both size and contemporary significance.

Gassed is based on the scene at a dressing station as it took in casualties from a mustard gas attack on the Western Front in August 1918. Sargent travelled to France with fellow artist Henry Tonks in 1918, observing the death and destruction firsthand in conjunction with a number of other artists, photographers, poets and prose writers who sought to bring home some small translation of the experience in Northern France and Belgium.

Image 6.2: Gassed (Singer Sargent, 1919) © IWM ART 1460

This painting is significant for being commissioned to tell the specific story it did, not shying away from the representation of gas use in war. The linked arms of the men, who lean on each other to find a way forward, show their vulnerability both physically and emotionally - which is significant in the immediate aftermath of Armistice when veterans returning from the continent were often disregarded by a society which was ill-equipped to navigate the complexities of their trauma and pre-disposed with a pervasive Victorian attitude. Gassed is explicit in what it pertains to,

the men have been affected by this new modern weapon, and yet also offers a glimpse of another, secondary meaning - the foreground of the painting contains realistic depictions of soldiers down to their webbing belts and the swathes of white linen bandages covering their eyes, but the background is abstract, devoid of any recognisable features other than a cold low sun. The environment is featureless and grim, drained of all colour, as if it has been polluted - which is a reasonable commentary for Singer Sargent to have made about tear gas and other war gas use.

6.3.2 Derry Murals

Experiencing the experience of the preserved murals to the Battle of Bogside, Bloody Sunday and the peace process in Norther Ireland, and the uniqueness of the place in which they are situated was one of the areas I was most looking forward to spending time on in this thesis. I had such earnest enthusiasm for a trip to Derry that I planned, encompassing the murals, the associated Free Derry Museum, a walking tour of the area and more. But what do they say about 'best laid plans'? Unfortunately, due to the global coronavirus pandemic, opportunities for travel during the period that I had set out for it were unavailable, and any potential that this work would be informed by the lived experience of a place was extinguished. I felt this loss of opportunity keenly, and reflected on it throughout the latter half of 2020, where I confess to becoming more than a little adrift from the intention of this research. I assumed that, without being able to travel to a place and be within it, soaking up the very essence of an ethnographic experience - and relying on more senses than just sight (touch, smell, hearing and taste) - that my experience would be worse for not leaving home. That notion, of a specific travel-based mechanism of embodied research, was the one that I was ultimately able to challenge, with the help of my supervisors, who sought to reaffirm that not all methods required or relied upon that lived experience. In thinking that my work was lesser for not having been to Derry, I was taking a reductive stance. Instead, it could be expanded – undertaking research by the means of digital exploration as a specific hinge and widening the explorations of this chapter to other artistic representations of tear gas use and how the experience translates into new mediums.

The Bogside Artists are a collective made up of three people: Kevin Masson, William Kelly and Tom Kelly. They are assisted by William's other son Paul, who is part of the wider team handling documentation, including the photography and

videography of their art. Together, the Bogside Artists are responsible for a collection of murals on the sides of houses and other premises in Derry, situated in a created and bound geographical hub which has become known as Free Derry Corner. They are an artistic response to the violence which was committed in Northern Ireland throughout the 1970s, not just in Derry but in Belfast, Omagh and as part of the wider peace process. Their material addresses "the scale of the daily violence experienced by the people of the North of Ireland is not to be assessed just in terms of fatalities and the physical and emotional results of the violence… I find myself responding most to the overpowering message of the murals: This is our story, where is yours?" (Sheehan, quoted by Melaugh, 2008).

These three artists are dedicated to using painting as a means to objectify the past so that its unconscious hold is unravelled. This explains both the style and historic content of their output. Their work is *commemorative* and in being so it is also curative as well, though I have included it here in this chapter, full of remembrances of tear gas which have been created, in order to accurately reflect some of the artistic license which has been taken with the source material, particularly where the original photographs do not show CS gas use as explicitly as the murals which have involved design decisions over a period of years.

The Derry Murals helped me to consider how tear gas use could be experienced and understood by a generation or generations who have not witnessed it in their community, as well as by the international audience travelling to the postmemorial space in search of the experience of a previous time or set of political conditions. Of the 12 Bogside Murals, five show gas or clouds of smoke, an unusual thing to render in paint, even if the context of the image included CS gas. That so many of the murals are based directly on photography brings another angle to the interpretative nature of the work of the Bogside artists, who have the ability to signify a spiritual dimension through their brushstrokes just as they have a duty to ensure the truth is rendered accurately.

6.3.3 Petrol Bomber

As discussed in Chapter 5, the source photograph for this mural is of the 13-year-old Paddy Coyle, depicted wearing a mask that was too big for him, holding a

petrol bomb and wearing a nationalist patch on his leather jacket. So iconic was the image that Clive Limpkin used the photo on the front cover of his book 'The Battle of the Bogside' showing a reverence for the subject and the emblematic pose.

The mural, painted in 1994, arose from that photos but has been revised, the mural is sharper and deeper than the original image, blurring and stripping the detail from the badge pinned to his leather jacket, and the anachronistic markings on the gas mask harking back to a previous conflict; whilst at the same time adding a detailed background, featuring the Rossville Flats, three Royal Ulster Constabulary (RUC) officers and a heavy cloud of gas which is almost billowing off the building with a sense of motion despite its two-dimensional nature.

The weapon in question is a petrol bomb, or Molotov cocktail, and is composed of glass bottle, fuel in the form of petrol, and a rag which when lit and aimed would see to the conflagration of its target. Petrol bombs were a popular weapon of the Catholic residents of Bogside, who countered the asymmetric nature of RUC and British Army patrols being armed with tear gas and baton rounds, as well as live ammunition, with something that would go some way into meeting their capability. "Tear gas is an asymmetric weapon, far more sophisticated than what is typically available to those it targets. … tear gas embodies a claim to restraint—based on precision targeting in one case and the absence of lethality in the other—aimed at sustaining moral legitimacy (Lindstrum, 2019:585). This was ultimately in vain though, as even the quantities of petrol bombs which were assembled by the Bogsiders in August 1969 were soon depleted, and they became overpowered in turn thousands of canisters of CS.

Recalling the day and how Molotov cocktails were "hurled with incessant fury at the RUC who had stationed themselves with their armoured vehicles at the foot of Rossville Street … White clouds of CS hung in the air like thick fog burning the throat and eyes. Old people and the very young were most affected" (Kelly, in Chaplin, 2017:29). This may go some of the way to explaining why The Bogside Artists have chosen to use lighter paints and place more emphasis on the clouds of tear gas in a number of their paintings, in far greater thickness and prominence than CS appears in the source photography.

This shows a deliberate design decision to centre the presence of tear gas and for the experience to have been emphasised, rather than fade into the background without a conscious act of remembering. The Bogside Artists acknowledge the manipulation of the image, and how it has been transformed from source to site. “Additional photographs and local knowledge supplied the other components of the image. As soon as the painting was completed, we knew we had captured something of the spirit of The Bogside. Young people were very much involved in that particular struggle” (Kelly *et al*., 1994).

Image 6.3: The Petrol Bomber © The Bogside Artists (1994)

6.3.4 The Rioter / The Saturday Matinee

The mural was started in August 2001 and finished in July 2006 - the last to be completed and is situated on Rossville Street in the Bogside area of Derry. It depicts a single figure of a boy, armed with a rock, eyeing up the encroaching mass of a 'Pig' - the colloquial name for an RUC armoured car.

Image 6.4: The Rioter / Saturday Matinee © The Bogside Artists, 2001

The source of this image is a photo originally taken by Clive Limpkin, and he has captioned it as follows: “there is a brief stand-off in William Street as he waits for the Pig’s next run at the encroaching rioters behind him. The shop window shutter might stop a rubber bullet but is no defence against CS gas” (Limpkin, 1972:68). In the photographic source, mysteriously, there is no canister of CS issuing forth smoke, so this again is a deliberate decision by the muralists to include, perhaps for reasons of artistic license, to provide the sensation of light and dark that balances the denim-clad rioter with the foreboding Pig. The middle ground is half obscured owing to the presence of tear gas, but this only adds to the evocative nature of the image and highlights how poorly the Bogsiders were equipped to counteract tear gas, if their only material protection came from shutters.

The riots were commonplace, but as the struggle became more prolonged, a pattern started to emerge of the most kinetic activity happening on Saturday afternoons, bringing a sense of routine and inevitability to parts of the conflict, hence the title 'The Saturday Matinee’. The joviality of what ‘matinee’ signifies was not reflected in the experience of successive weekends’ worth of tit-for-tat, with each passing occasion bringing Bogsiders and RUC or the British Army closer into a conflagration of frustration.

With respect of postmemory, the recollected experience of tear gas use is able to be brought forth firstly by the representation of tear gas in the murals, and secondly by its encoding as significant in them: both in terms of spatial composition and adversarial presence that shows an artistic adapting and (re)interpreting the source material to really strengthen the representation of tear gas use as well as make it appear detrimental, horrifying and persistently impactful. For the Bogside Artists, who rejected the use of CS by RUC and British Army personnel, particularly as it made precarious the elderly or young of the community, this purpose is to be emphasised and foregrounded, to add to the confusion, chaos and challenge that these artworks represent. A conscious decision during the sign-making of these murals would have been to include representations of tear gas – allowing for the transactional communication of its impact to be made: the murals would have still shown vulnerability had they not included the clouds of tear gas by virtue of their human (child) subjects, but to foreground and situate tear gas in these designed and moderated

scenes can be interpreted as the acknowledgement that its use was impactful at the time and needs representing as significant even all these years later.

6.3.5 The Runner

The final mural which forms my exploration of how tear gas use is remembered or contested by public art is entitled The Runner. The scene depicted is typical of many riots that happened in the Bogside from 1969 through the early 1970s. Following the deployment of a canister of CS gas, three boys are in full flight, trying to escape before being overtaken by the cloud and succumbing to its effects.

The mural is bold with its colour choices and composition, though close to being monochromatic in the staging of the young boys – various shades of blue and black are the overriding palette utilised, which serves to emphasis the billowing white clouds emanating from a CS canister. The layout of the mural makes effective use of perspective, where the three subjects run as if able to leap straight from the two-dimensional, from background to foreground. As they are represented, the details of their clothing and facial expressions become clearer through the staging of the image. Within the mural there is less opportunity to analyse the textual representation as there is for the semiology and composition – though this does not necessarily need captions to be interpreted as representing the memorialisation of two boys, who are captured in a small segment of the mural towards the bottom, with what appears to be their school photos. Speaking of the composition and how it portrays the effect of symbolism, with one hand coming to cover his mouth, the boy in the lead of this foot race to fresh air looks as if he is coughing or struggling for breath. Similarly, the boy behind him also has a hand raised to his head in a gesture of self-defence, or self-preservation. The scene could have been captured by any of the photographers or journalists present, being as familiar a scene as it is. The younger boys would know the streets and alleyways of Bogside so intimately, they could navigate around as if blindfolded in order to frustrate or harass the RUC and British Army personnel patrolling. When the two sides encountered each other, and having exchanged the customary petrol bombs, rocks and stones, it would only be CS that would force the boys to retreat breathlessly.

Image 6.5: The Runner © The Bogside Artists, 2006

6.3.6 Other murals

There are two other murals across the 12 in Free Derry in which the billowing clouds of CS are present: Bernadette, and Bloody Sunday. Bernadette depicts the address by MP Bernadette Devlin to crowds in Bogside. She was a young MP, elected to Westminster at only age 22, and became a talismanic, seminal figure of the civil

rights campaign. Her speech, which was judged to have been inciting a riot (for which she received a six-month sentence) was delivered via loudhailer. Upon finishing it, to demonstrate her commitment to the violence which she had advocated for, Bernadette was photographed smashing paving stones to make smaller missiles. The famous moment took place in front of where her mural is now located.

In order to highlight the role of women in the Battle of Bogside and throughout the troubles, Bernadette is pictured amongst clouds of tear gas and three other women, painted as if they are making noise with bin lids in the customary manner that alerted the neighbourhood to an impending Army raid, signifying the importance of women in enhancing community preparedness and resilience.

Again, the presence of tear gas in this image is largely symbolic, but I started to understand why the Artists may have taken steps to include it – when tear gas has persisted around the neighbourhood streets and in the houses of residents for so long, why should it not be signalled and acknowledged. The promotion of a narrative of environmental occupation by mural goes hand in hand with the mission of the Artists to acknowledge, with dignity, the fullness of what the city was subjected to.

Finally, the Bloody Sunday mural, which depicts the some of the events of the 30th of January 1972 features a cloud of tear gas enveloping the figures of a group of men carrying the body of Jack Duddy from the scene of the shooting. The mural is largely tonal greys, save for the deep red blood splatter on the banner which reads 'Civil Rights' at the bottom.

6.3.7 Art and assemblage

"What confers a unique provenance on our work is the fact that we, both as artists and as citizens, are part of the story we feel obligated to tell. The story of the Bogside is our story and vice versa." (Kelly *et al*., 2009) The murals reclaim the local identity and emplace the experience of being from Derry, in Derry. In this section of the chapter, I will use theories of the relational turn or new materialism to help conceptualise the Derry Murals as not just a collection of publicly accessible art pieces but as an assemblage.

The Derry Murals have become the constituent assemblage for recollections of postmemory and mourning with regards to the Battle of Bogside, and the wider period of The Troubles. The site itself is bursting with different temporalities, composed of murals which span a time period of 30 years as well as buildings who differ in their relational age. Some survived the bombings and bear the scars; some have been rebuilt in their previous image in an attempt to promote a sense of temporal continuity. Together, the murals and the neighbourhood of 'Free Derry' forms an assemblage: an open system, dynamic, changing, affected by relations (Anderson *et al*., 2012). The assemblage is not just in how the Derry Murals have been brought together in congruence, but how they fit into wider structures such as the socio-political creation of the Free Derry Museum, the economies of the local area, and its ongoing governance.

The agency of the Bogside Artists collective in designing and sharing Derry Murals is brought to the fore through this exploration of what they can tell us about one specific area - tear gas and its representation - but is also subject to contestation. Should art be allowed to remake photos? Does the revisionist artwork - with tear gas emphasised in a number of pictures – mean any less because is it not representative of reality? I believe it means more, that there has been an opportunity to highlight one of the grievous injustices of the Troubles, the overwhelming over-deployment of CS gas, and use it for the purposes of haunting reminder and evocation.

Garrett talks about the way that narratives of place are conjured by DeLyser, Edensor, and Maddern, who bring the intangible affect into a perception which can be shared. Their work, to Garrett, "manifests itself in writings about memorial events, ghostly presences, feelings and emotions that embed themselves in places, hiding in dark corners to be invoked by a passerby, places where even a whisper shatters our perception of what is, what was and what could be" (Garrett, 2010:533)

Tear gas may have long dissipated from the streets of Derry, but its presence is still felt keenly and actively remembered in the form of artwork throughout the area. This makes me question: can it ever truly disperse while it is being actively remembered? As Jones asserts, memory is not "a world of cinders" (Derrida, 1991:315) but a world of "embers – for they retain a trace of fire – of life – and if disturbed, or fanned by a breath of air, can burst back into renewed life." (Jones,

2011:875). Thus, the art of the Derry Murals retains its connection to the living, even if the events which are depicted slip away another generation or generations.

6.4 Conclusion

The culmination of this chapter is to say that I have learnt as much about tear gas use as I have about human struggle and resilience, and how the experience of that can be expressed in all manner of ways. I set out to understand how tear gas use was experienced through artistic mediums, what additional representations that it enrolled or unfolded, and to consider what these told us about the place of tear gas in domestic riot control today.

In this part of my exploration of what tear gas does to those who experience it, I will draw not only on this chapter, but across the preceding chapters. Firstly, I focussed on the things we curate that relate to tear gas use - the spaces of memory or mourning where its presence is still felt, undispersed, through affective atmospheres. I then examined the things we capture which relate to tear gas, including the evidential matter of its use as well as how that evidence of seeing can become reimagined or reused over time, particular when it attracts complex bureaucratic attention.

In the preceding chapters I have collated and explored evidence of how tear gas use was captured by different technologies including photography, videography and audio recording. There was also a small segment about how tear gas use enters the official record of Public Inquiries and what this additional governance does to our understanding of the legitimacy of sources of information. In addition, we saw how tear gas was enlivened by museums and spaces of commemoration, preserved through the archive. Yet, nowhere, in any of these sources, was there an overwhelming sense that tear gas is a welcomed, legitimate or constructive tool for policing agencies to utilise. All of the sources, in some way or to some degree, spoke of the difficulties that it presents to them and to their cause or their existence.

On reflection, I have unequivocally show that, in a multitude of ways and through a multimode of means, the experience of tear gas is destructive. It may be traumatic, echoed in the sadness of poetry which turns soldiers from men to boys (Owen, 1917). It may exemplify how, since the first opportunities to procure tear gas, there has been a racist configuration to lobbying, marketing and its distribution which

is still as impactful today as it was to the first cities in the US wishing to empower themselves with a weapon of war. It may be frustrating, benign in the nature of harm caused - but present through sensations of discomfort such as in anecdotes from the Oral Histories project of the IWM. The only constructive experience of tear gas use that I have encountered through the entirety of this examination of a wide range of pieces of evidence is how it can be used to simulate the conditions of being exposed to a far more damaging scenario, and therefore act as a training tool which enhances personal preparedness. In concluding, this evaluation of the nature of tear gas use through exploring the nature of how it is experienced or contested, leads me to reflect on the destructive nature of something purported to be ‘less lethal’ and only capable of generating tears and minor discomfort. The weight of the experiential, artistic, reflective or documentary evidence of harm from people who have experienced it shows that it is anything but benign.

7 Conclusion

"You take my life / When you do take the means whereby I live"
(Shakespeare, 1598:368 - The Merchant of Venice Act IV, Scene 1:368)

"It is the defenselessness of breathing, which I would like to talk about in conclusion…
To nothing is man so open as to air"
(Canetti, 1936)

7.1 Reflections on the thesis

This chapter will act as a summary of the key findings and insights which have been encountered or created through this thesis, as well as situating the context of this work: through an understanding of the contributions which it makes to theoretical, methodological and practical understandings of tear gas use, the limitations and challenges of this work - which has spanned seven years of part-time study - and finally by offering some thought on where it may go in the future, as the future of tear gas use by policing and military agencies very much remains live and debatable. Will the next one hundred and ten years see expansion in tear gas markets, additional appetite and take-up of the product across volatile and escalating conflicts, particularly in developing nations; or will lessons be learned and contribute to a de-escalation or disarmament of the global tear gas market, with reflection on the ineffectiveness of its use, its traumatic impact and painful legacy? Through reflecting on the numerous empirical examples selected and examined during the preceding three chapters, there is now an opportunity to link, compare, strengthen and challenge the conceptual findings of this research. There are a number of ways by which the sources were examined, including through critical visual methodologies (Rose, 2001) and the sources which effused the most telling perspectives of vicarious experience of tear gas use were often the visual or material, as opposed to the written.

Tear gas is a chemical weapon by any other name; a tool for exerting control conceptualised during conflict but proliferated during peacetime. In the American context, tear gas use is entrenched in debates about the inherent racism of policing, wrapped around the mainstreaming of police militarisation which has taken place since the late 20th Century. In the British context, development of tear gas came behind the curve of other major world powers although still at the expense of the subjects of colonial policing units (Mankoo, 2019) particularly in South-East Asia and across

British African territories, and was intrinsically linked to concepts of imperial power, and subjugation of a groups of people believe to be 'undesirable, particularly in keeping with the ethnographic paradigms of the 'savage' (Ellingson, 2001).

Passing through time and space in the pursuit of memories, experiences and other reflections on the ephemeral and mystical clouds of tear gas use on combatants, protestors, civilian and militarised bodies, policing and the policed, it becomes all at once clearer and more nebulous how tear gas influences processes of memory creation, curation and continuation. Three separate segments of time have given us a slowly changing narrative - from equally militarised combatants utilising a new modern weapon to gain strategic advantage in the trenches of World War I, to the multitudes of state violence perpetrated by policing bodies worldwide, armed with a weapon not even afforded to armies of a particular country, utilising it with impunity on lesser-armed and lesser-prepared civilians. Covering that period of the last one hundred and ten years, this thesis has constructed itself around three broad thematic areas which have allowed for the interrogation of geographies of memory-forming or memory-creating, incorporating the treatment of mediums ranging from the artistic to the poetic, as well as the sites and spaces of tear gas use or remembrance. This has created a large and varied lens through which to view tear gas use, allowing for a new method of entry into the subject of such riot control agents through feminist geographies, memory work and geopolitics whilst simultaneously supporting the call for further investigation in (by) the scientific sphere.

This thesis set out the intention to explore tear gas use through a different medium – not quantitative medical or scientific literature where sterile- sounding terms such as lacrimation, blepharospasm and pulmonary oedema are presented, but something softer and more qualitative that acknowledges the huge impact which vicarious trauma, or the witnessing and examination of traumatic subjects, can have to the researcher. Companies straddling the military-police-industrial complex speak of riot control agents utilising the former terms because they lack the emotional descriptive quotient supplied by personal reflections which would provide a visceral and viable counter-narrative to the proliferation of chemical weaponry and the harms which are perpetrated in the name of 'less lethality' - so I knew that this thesis would have to find a powerful voice of contention in order to mitigate the effects of such disingenuous etymologies. The medical literature encountered early upon in the

literature review provided a foundation, but I was so much more interested in the longer-term effects, as well as the personal affect of tear gas use, which became more apparent when sources such as memorials and memes were studied as well as engaging feminist geographies and more qualitative research methods.

7.2 The path not taken - other sources of insight

There are a number of other sources of insight regarding tear gas which were explored throughout this research but ultimately did not support inclusion in one of the empirical chapters preceding this, including official accounts such as Hansard, the record of discussions in the UK Parliament. Both the House of Commons and the House of Lords are subject to meticulous recording, which provided an interesting source of data to supplant the curated, captured and created reflections of tear gas with those which enter the sphere of politics as an experience *commented* on.

Utilising Hansard, it was possible to search for "tear gas" as a term - up 71 references as of September 2022:

Location referenced in connection with comments / questions mentioning 'tear gas'	Frequency / count
India	5
Hong Kong (student demonstrations 2014-present	19
America (including BLM protests in 2014 and 2020)	9
Turkey	1
Israel / Palestine	6
Colombia	3
Afghanistan	3
Zimbabwe	2
Sudan	6
Sri Lanka	1
France (Champions League final 2022)	7
Yemen	2
Catalonia	1
Belarus	1
Myanmar	1
Cameroon	1

Togo	1
Nigeria	1
Greece	1

Table 7.1: References to “tear gas” in Hansard, tallied (Author, 2022)

The UK Parliament hears questions about tear gas with a reasonable frequency. It is possible with a relative degree of accuracy to look at the record of when tear gas is discussed by politicians in the UK and pinpoint when specific disputes, protest and riots have occurred. For example, a high prevalence of questions in the summer of 2020 corresponded to the Black Lives Matter movement in the US, and concerns that our relationship with the United States as an exporter of tear gas made the UK complicit in its use against civil rights protesters during a global pandemic. Similarly, a spike in questions about tear gas in the late spring of 2022 corresponded to scenes from a single event - the UEFA Champions League (football) final in Paris, France, where travelling Liverpool United fans were subjected to intense over-policing from the French, and were ‘kettled’[3], denied access to the stadium that they had paid hundreds - if not thousands of pounds - for tickets to enter, then tear gassed on multiple occasions by notably militarised police officers, without the ability to access first aid when affected.

A clear divide between the attitudes found in lower and upper chambers, as well as across both benches regarding tear gas use is found upon further interrogation of Hansard. Mark Field (former MP for Cities of London and Westminster, suspended in 2019 after an assault allegation) attempted to downplay the involvement of the UK Government in the global supply of tear gas and the significant harms it was doing in Hong Kong with a statement in 2019: “The Right Honourable Gentleman touched on the use of tear gas and rubber bullets, and I would therefore like to talk a bit about export licences; I know this has been brought up in the pages of The Guardian today. The last export licence from the UK for tear gas hand grenades and tear gas cartridges used for training purposes by the Hong Kong police was in July 2018. The last export licence for rubber bullets was in July 2015.” (Hansard, 2019a).

However, in the House of Lords, it was identified as a cruel irony that the UK

[3] A policing term for containing and controlling the movements of a group of people

was still complicit in the development and supply of tear gas amongst other 'less-lethal' solutions with a statement from Lord Foulkes of Cumnock: "The Minister must agree that it is a cruel irony that these people, who are suffering from disease and starvation, continue to be attacked with weapons supplied by the United Kingdom to Saudi Arabia and the United Arab Emirates. Incidentally, similar companies are now supplying tear gas and rubber bullets to the United States. The Minister dealt briefly with this, but what review are the Government undertaking of who we supply arms to and what they do with them? It really is an embarrassment to all of us in the United Kingdom." (Hansard, 2020). Most striking was a comment made by Lord Patten of Barnes, that "tear gas is not a substitute for talking to people and trying to deal with their real grievances" (Hansard 2019b) which could have been utilised as the overarching conclusion of this thesis as it speaks to the fundamental injustice that a weapon of war is still being utilised for movement suppression and protest repression across the globe today.

7.3 I can't breathe - tear gas use in a global pandemic

Throughout the experience of writing this thesis, there were parallels which emerged between the commemorative practices of tear gas incidents highlighting historical struggles for breath, and the experience of many during the global coronavirus pandemic as well as Black Lives Matter protests occurring across western nations - two seminal events in our contesting and contrasting understandings of breathing, freedom, and air. Bringing together the collective traumatic experience of a global pandemic and more targeted examples of tear gas use within it allows for reflection on some of the most significant events occurring in 2020 and 2021, during the span of this project's research – and to further understanding the context of how tear gas use has become so fiercely contested by both official (the scientific research community) and unofficial groups.

During the first months of the pandemic, the concept - frequently meme-ified - that 'nature is healing' because of clearer skies and cleaner cities butted against a resentful, increasingly disobedient population that felt their individual freedoms were being curtailed owing to the new practice of being 'muzzled' by the global adoption of face coverings predominantly in enclosed public spaces.

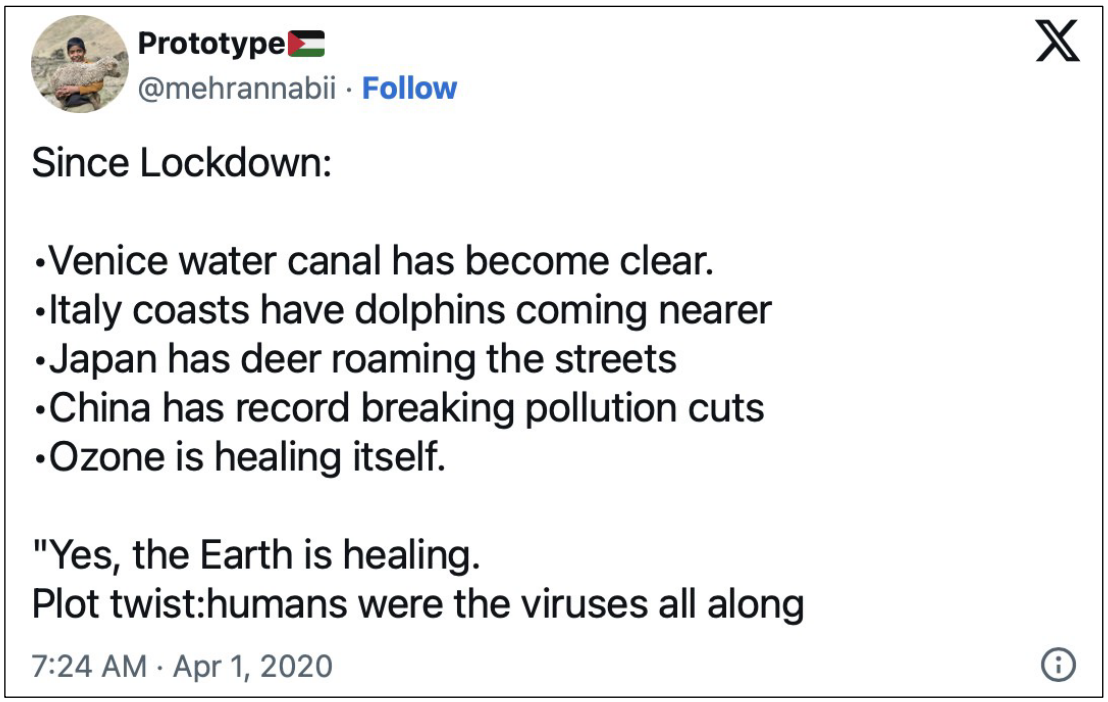

Image 7.1: Screenshot of a post on X (Cohen, 2020)

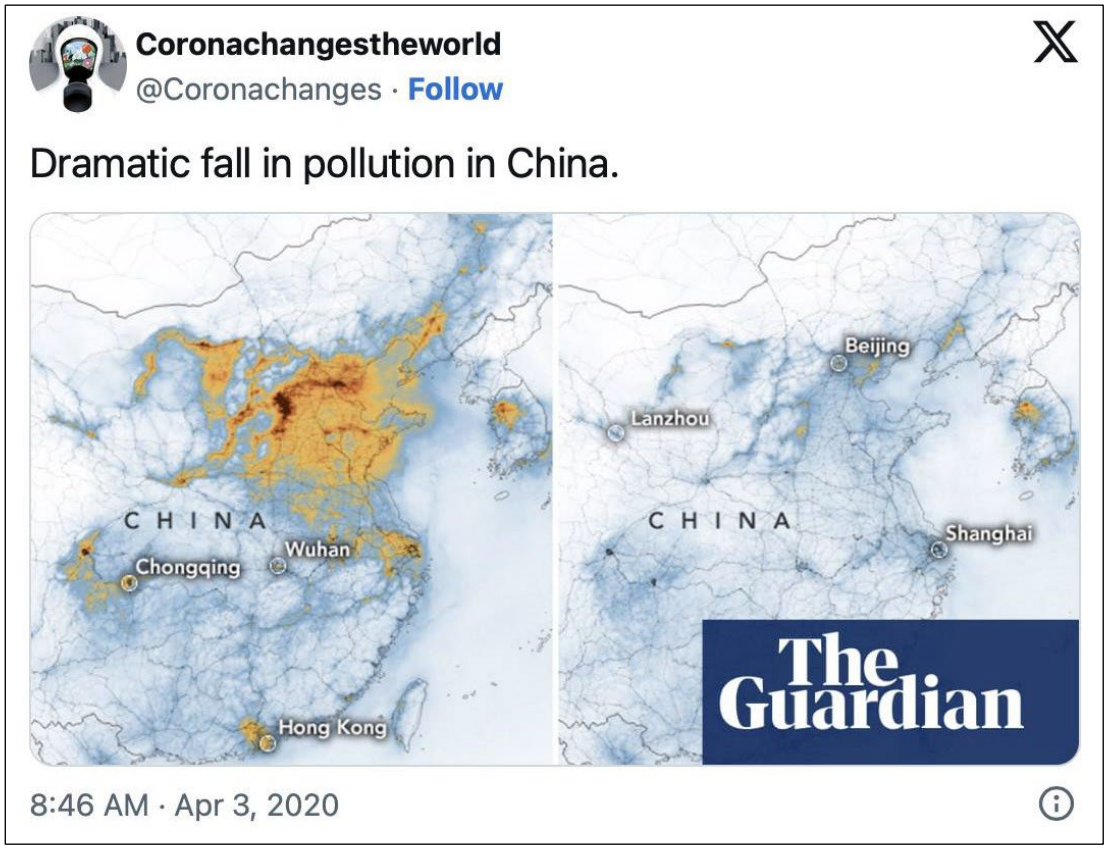

Image 7.2: Screenshot of a post on X (Cohen, 2020)

Whilst some netizens extolled the benefits of a reduction in the release of greenhouse gases and other pollutants into the atmosphere courtesy of reductions in travel, particularly aviation, an emergent and extremist right-wing regurgitated

radicalised claims of conspiracies relating from everything to the lab-based virus origin, the microchips in vaccines promulgated by a global dominant world order to the transmissibility of the virus being aided by 5G towers as well as the fundamentally incorrect notion that masks - which became a key feature of the conditions of participating in elements of society such as accessing public transport - were depriving them of oxygen.

Pandemic restrictions competed with a flashpoint of global anger concerning the devastating and violent experience of Black people in America and a struggle for justice owing to the actions of Derek Chauvin (now convicted of murder) kneeling on George Floyd's neck and depriving him of breath for eight and a half minutes. In the latter half of 2020, the thick, clogging, acrid smoke rising off funeral pyres in India contested the notion that the global pandemic for a second could have made this world more breathable as some optimistically thought the temporary removal of cars from motorways and streets would be. Instead, by a myriad of means, people have found less breath in the past year than ever before - from multiple incidences of police brutality, to the re-emergence of the Jummah protests and an Israeli Defence Force keenest on squeezing territory and air from their Palestinian subjects, to the literal oxygen shortages that caused a classist importation frenzy for wealthy Indian families to secure canisters for their relatives use, during a violent second wave of the pandemic in India which fuelled the emergence of a more transmissible variant of Covid-19.

Even long-Covid, the widely ranging post-illness effects which saw people incapacitated far beyond their period of infectiousness, affects our breath and our energy. In parallel ways, we are now only just learning from a small but determined segment of the scientific research community about the post-tear gas injuries and illnesses - long-Tear Gas? - that affect mobility, vision and respiration, having for so long been sold the lie that tear gas was 'non-lethal' and a viable, conscientious option for public order policing units.

Juxtaposing the significance of a chemical weapon constituting an intoxicant to the respiratory system, a lacrimatory chemical agent, and one which formed 'clouds' of inaccessible, unusable, 'tainted' air at the same time as a respiratory virus saw us focus on the unknowably catastrophic potential of our ventilation systems to cause death and spread disease, and as the weaponisation and stratification of dirty or clean

airs captured political, social, and cultural imaginations. The cloud of Covid-19 really and truly permeated the public and private spaces in a way that the clouds of tear gas could never have achieved. Covid-19, for a short time, acted as a far superior crowd dispersal tool than tear gas, shutting down entire cities, not just blocks or parks.

With all of the focus on Covid-19, concerns about ventilation and respiration at its core, I felt an exceptional kinship with the original literature on the use of gas in warfare, and with Sloterdijk speaking of how when "the air lost its innocence" (2009:109) was when it was at the most vulnerable to exploitation via the mechanism of atmoterrorism. For two years during a multitude of restrictions enacted across all levels of government, which also suspended a number of rights of assembly and criminalised protest, the potential for compounded atmoterrorism grew.

Not that protests about breathlessness were new to citizens in America. Writing of the 'terror in the air' following the death of Eric Garner in 2014, suffocated by a police officer, drew the reflection that "our gasping for air occurs at a time in which both [inspiration and absolute freedom] are either violently repressed or made impossible by strict regimes of austerity and police brutality. We cannot breathe because the air is congested and polluted. If air is freedom, then the breath is its radical calling" (Nieuwenhuis, 2014).

Six years later, Danez Smith, author of one of the poems examined in Chapter 6, wrote on the Minneapolis protests occurring after the death of George Floyd. Even the title: "*Crying, Laughing, Crying at the George Floyd Protests in Minneapolis*" struck a chord with the lacrimatory affect of tear gas use and its emotional connection - with tears and the act of crying normally a personal response to trauma as opposed to an induced effect of being exposed to chemicals. In a caustic critique of the policing stance in America in 2020 which sees personhood - at least Black personhood - protected less than property, Smith writes "Heading back downtown, the energy has changed since we left. What happened? The cops showed up, anger-drunk and tear gas in hand. Folks peacefully marching in the street has turned into rubber bullets to the body, and crowds scattered in fear. We loop downtown on foot, from corner to corner, until we end up on a street trapped by M.P.D. in riot gear in our faces, the sheriff's department to our backs. When was Covid-19? What infection did I fear last week? The cops are the sickness." (Smith, 2020) It is really difficult to reconcile the actions

of police units, especially in cities such as Minneapolis, who clogged the air with tear gas at a time when public health messaging was highlighting the importance of proper ventilation as an essential means to limit the spread of Covid-19.

7.4 The vicarious experience of tear gas use

Collating reflections and analysis from the preceding three chapters and re-ordering them into elements of the vicarious experience of tear gas use allows for an opportunity to bring together a number of tangible outcomes from the research question.

If the last one hundred and ten years have shown anything regarding tear gas use, is that it will persist in our communities, states, and nations long after it dissipates from the atmosphere of those spaces. It will persist in the consciousness and memories of those affected, even if (and by some miracle, owing to a serious and alarming absence of medical literature on the long-term harms) it dissipates from the bodies of those it is used upon. And it will persist in the reflections that we curate, capture and create. Through an autoethnographic approach to engaging with the sites of memory and mourning, as well as utilising vignettes and traces as I encountered the material evidence of tear gas use, intertwined with source analysis, I have engaged widely around the topic of tear gas as evidence of a violent geography of state and police control still being perpetuated, one hundred and ten years after its introduction.

This thesis has provided new insights, entails a mechanism for new explorations, and makes multiple new analyses of the experience of tear gas use. It set out to provide a wide-reaching and ranging thematic analysis tying acts of violence to acts of remembering and has provided a thorough exploration of the conceptualisation of tear gas use through the creation and sharing of experiences. This thesis makes three conclusions: firstly, that we can, and do, vicariously experience the sensation and trauma of tear gas use through its memories, memorials and monuments – which provide the opportunity to interpret not only what it feels like to be exposed to tear gas but also the lasting harms that it causes, whether physiological or psychological. The empirical chapters have shown, through their examination of all manner of sources, what tear gas means to the people it was used upon, as well as how it is countered through representation which aims to subvert state controls and the excess of bio power implicit in a deployment of tear gas.

The research question was twofold: to explain what the experience of tear gas use was on humans – the 'we' of who the subject of vicarious witnessing is – and then to outline the implications and legacy of its use. The representations of the use of tear gas manifest in the empirical chapters. Tear gas use features in poetry and cartoons designed to warn children and adults alike about the dangers of war gases and is not treated markedly differently to gases such as chlorine and phosgene which were responsible for marked atrocities in WWI. It features in a number of murals, and in most is over-emphasised from what the original material which inspired the paintings showed. It also shows up in a high quantity of reflections from a particular time period, where five of the twelve total Derry Murals feature the artistic representation of tear gas in some form, proportionately significant given the wide range of sources that the artists have drawn inspiration from also includes a number of commemorative portraits.

When we want to feel, and understand, fear or horror, we don't first look to put ourselves in a position to experience it directly in perilous circumstances, but through other mechanisms - controls or partitions, like films, books, or tours of places. This is does not bring us to a fulsome understanding the real lived and embodied experience of trauma, but a crafted version distilling the characteristics or maybe just the impressions of what that was, which can be engaged with safely, utilising one's own prior knowledge and perspectives, in order to constitute vicarious witnessing. The impact engaging with this vicarious witnessing is that the impact of tear gas use is brought forth from the empirical sources into an understanding of its legacy. Tear gas causes trauma, to those it is used upon, the surrounding structures or groups (especially when the inequalities created by repeated exposure to a detrimental chemical weapon are examined) and even to those in a position of leveraged power or influence, shown across a number of examples where accidentally tear gassing, or exposure for training purposes, still causes a painful and negative reaction in the subject. That trauma, that tear gas use causes, spans generations. The implications for the legacy of tear gas use span the full one hundred and ten years of its existence, where gas warfare was seen as one of the horrors of modernity, gas exposure was entwined with the processes of militarisation and occupation – hated by the populations subjected to it in Northern Ireland – and the malicious illogical targeting generated anger and fear felt by football fans when exposed more recently. Those generations of people vicariously experiencing tear gas use, through poetry, paintings or prose, are able to engage with

the trauma of its use through concepts of vicarious resilience, where witnessing and understanding trauma fuels a corporate memory which translates into a reduction in vulnerability to the impacts of tear gas use through knowing simply how to counteract and resist it.

Grief, anger and dissent are awash in the empirical examples, where this research has navigated evidence – in terms of the coding of textual analysis, critical visual methodologies, what is stated or implied through discourse as well as brought out from the historical context of the archive as a repository – and interpretation – in terms of how the impact of tear gas use is represented to be harmful, painful, repulsive, affective and more. In Northern Ireland during The Troubles, tear gas use was emblematic of the struggle felt by Catholic residents of Bogside and other estates, enclaves and establishments to retain their identity in an atmosphere which was frequently invaded and exploited. In America, particular in the last three years, tear gas use has robbed people of their dissenting voices and caused breathlessness as well as exacerbating feelings of being surrounded, encapsulated and erased by the state. To Americans participating in Black Lives Matter protests, the use of tear gas by militarised police units has brought racialised violence out of the 1920s and into the 2020s.

The second to be outlined is that tear gas is a disingenuous etymology; causing far more than tears to those it is utilised on. Tear gas is described variably as "less-lethal" or "non-lethal" and marketed as a 'riot control agent'. This thesis highlights these terms to be demonstrably false. Harrowing video and audio from Indonesia show the effect of tear gas in the confined atmosphere of Kanjuruhan stadium. Muslim Brotherhood members allege their compatriots had been loaded into trucks and tear gassed, clawing at the soft sides for a source of fresh air before succumbing to respiratory arrest. The two markers of tear gas permissibility in the arena of contemporary policing are that it does not cause lethal harm or long-lasting harm. This thesis is not the first to disprove this, or maybe even the most comprehensive - as compelling media evidence exists and calls for further investigation are being made loudly across multiple sectors. Rothenberg *et al* provide the argument for reassessment in a comprehensive article which states emphatically and unambiguously "a reassessment of the health risks of tear gas exposures in the civilian population is advised, and development of new countermeasures is proposed" (2016:96). However,

this thesis does successful speak to the medium- to long-term harms done by tear gas, which manifest themselves through reactions, reflections and remembrances of the experience of its use in a variety of multimedia formats.

Whilst the investigations of this thesis have sought to breathe life into the everyday experiences of tear gas use, to shine a light on what we can be told if we just listen to paintings, poems or films amongst a vast array of accounts, they have also exposed the difficulties with considering tear gas's place in domestic policing arrangements as a riot control agent - the evidence is overwhelming that tear gas causes compound primary, secondary and tertiary harms - suffocating the persons, the atmospheres and the movements upon which it is used. Understanding the argument for tear gas use by policing bodies in the 2020's drags us back to the lobbying efforts of Amos Fries and the CWS in the 1920s, where an attempt to justify the use of tear gas was made on account of the ease at which it would bring the 'mob' (a coded term for Black Americans) under control. The harm of tear gas is exemplified in the example of its use to deliver sustained campaigns of terror such as those wrought on French or Canadian regiments by early German gas units, and from the multitude of ways in which tear gas is actively countered by protest or activist groups today as an unnecessary, traumatic and contestable experience that they should not be subject to.

The promotion of 'war gases for peacetime use' was strategic, encompassing Fries extending influence on journalists, scientists and politicians in an attempt to whitewash the reputation of chemical warfare, transforming it into something intrinsically linked to the future of policing. Journals were created to serve this propaganda arch, including Gas Age Record, where in 1921 Theo Knappen wrote that Fries had "given much study to the question of the use of gas and smokes in dealing with mobs as well as with savages, and is firmly convinced that as soon as officers of the law and colonial administrators have familiarized themselves with gas as a means of maintaining order and power there will be such a diminution of violent social disorders and savage uprising as to amount to their disappearance" (Knappen, 1921 in Feigenbaum, 2017) and that in future policing of public disorder or when attempting to disrupt protest activity, tear gas "will be the easy way and the best way." (Knappen, 1921 in Feigenbaum, 2017)

The third conclusion that I raise is that in terms of its practical application, it is far more likely to escalate a protest situation than dissipate one, again contributing to

the reactionary media which outlines how severely negative and harmful the experience of tear gas use is. I developed the term to 'disintegration through escalation' describe the central hypocrisy with the matter of tear gas use on protests occurring around the world: that attempts to use tear gas as a 'riot control agent' - as in, to bring about control to disorder or riotous crowd behaviours, are unfailingly and overwhelmingly misguided. Tear gas is coded differently by groups depending on where they occupy space along the spectrum of state / governmental power. The experience of tear gas use throughout the three empirical chapters of this thesis has depended on whether the subject of the exposure is able to overcome the encounter, or whether they succumb. The way in which tear gas is compared to other, more lethal war gases in propaganda from the US Army, for example, diminishes its toxicity, but narration from photojournalists exposed to CS on multiple occasions acknowledges the compounding risk of re-exposure. The point of tear gas deployment on a protest is actually the point at which fragile boundaries and prosocial behaviours which may have brought the demonstration to a peaceful dissolution actually collapse. The simple fact, that one does not need a reading of war poetry or to stand in front of protest murals to know, is that tear gas does not work as a mechanism of controlling riotous assemblies. People do not react rationally to being tear-gassed. In accounts of protests in 2014 and 2020, those who experienced tear gas at the hands of US police departments saw it as the tipping point for either reactionary and retaliatory violence (picking up whatever missiles were around to return 'fire') or a breakdown of the structure, direction and composition of the protest. "This is a testament to the total bankruptcy of the use of tear gas as a protest management tool" (Trafford in Dickinson, 2023) which exemplifies the messages which have been decoded through examining the experience of tear gas use. At no point have any of the sources studied during the course of this thesis promoted tear gas use as an effective technique for dispersing protest, or have protestors acknowledged that, once tear-gassed, they retreated away from the space or place of their gathering and allowed their dissent to dissipate with the last vestiges of the CS. Instead, as the creative reflections have shown, there are intergenerational traumas (Hirsch, 2008) which are passed on relating to the exposure to tear gas, and these are evidence of its potency as much as its ineffectiveness as a RCA. What, then, is the point of maintaining it as an exemption to prohibitions and conventions? Maybe (as Serwer (2021) argues about Donald Trump's presidency) the cruelty is the point.

7.5 Further research

Often, when beginning to approach the literature of a particular subject area for a project like this thesis, one is encouraged to identify a 'gap' in the literature and use that as a guide for entry into the research and for the explication of material, whether sources found or generated. This project has done that in many ways but also deviated - the gap in the literature which exists regarding tear gas is at its most apparent when considering scientific research, which this thesis does not seek to supplant with new knowledge. For a multitude of reasons relating to access, training, vetting, skills and funding there was no question that this thesis could address medical effects of the effects of tear gas. Building on their conclusions though; that tear gas has no legitimate or justifiable place in riot control processes until there is a comprehensive review of its lethality, toxicity and effects, is the overriding assertion of this thesis, and one which has implications for policy and praxis work as well as to further research endeavours. In addition, this work was limited by a number of factors, time being the most significant (even though it spanned seven years, it was carried out part time and with mitigating factors related to employment) and thus future research would benefit from being more discrete and constrained to a particularly razor-sharp lens of focus.

Issues of access, secrecy or confidentiality are a significant limitation to the ability of a research to engage in the topic critically. Historical sociologies of tear gas have identified the major manufacturers and nations involved in its proliferation, and actor-network theory would be a potential theoretical approach to consider in future works which look to shine an uncomfortable light on the use of tear gas which persists today. Every source engaged with, site entered, the poems that enthralled and the prose which entreated the conclusions which have been reached about the long-term, pervasive and permanent effects of tear gas is overwhelmingly in the negative, characterising it as an impactive and detrimental object to experience. This is a seminal moment to be a researcher of tear gas use: calls for re-evaluation of its use by policing agencies around the globe are gathering in strength and the weight of medical and scientific literature regarding its impacts and consequences is overwhelming.

Topics worth considering in future research, whether policy-based or in `new academic opportunities span a number of themes in geographic literature, from the resurgence of atmospheres and volumes, to our understanding of violent geographies

- in particular geographies of movement repression, protest, and thanatopolitics. Research interests regarding geographic emplacement of tear gas use could be expanded upon in the future, aligned to new mapping techniques including the use of geospatial rendering such as those utilised by Forensic Architecture in their excellent account of 'Tear Gas Tuesday' (Trafford, 2023) as there is still much scope to consider at the intersection of concepts of place and space with concepts of air and volume. It may be that the effects of tear gas use in protest are able to be predicted, by taking into account factors such as weather and climate, the built environment of an area, and what is known about the compounds themselves. Professionally, tools or platforms such as Chemet in the UK, used by Fire & Rescue Services to map plume distribution from HAZMAT or chemical incidents, may be the vector into a practical predictive modelling of the tear gas cloud and therefore a greater understanding of its immediate impacts to those who would seek to utilise it in public order incidents.

Finally, it would be remiss of me to not suggest a future interest along feminist geographic research themes, exploring the impact of tear gas use on women and children, especially with concerns mounting that CS among other tear gases is an abortifacient and has detrimental teratological effects (Wilson, 2021) (Reece, 2022). In response to the dichotomy which arises when tear gas has been used in protest scenes in America, where women in particular took to the streets to show their abject rage at policy changes which rowed back the protections of Roe v Wade during the fraught period of Donald Trump's presidency — a critical judgement made by the Supreme Court regarding a woman's right to access an abortion — there is a cruel and unusual dichotomy in play. "It is essentially legal for police to endanger pregnancies by assaulting protesters with likely abortifacients" writes Francis (2022). Whilst scientific research suggests the association, and some correlation (Guerra, 2009) between tear gas exposure and miscarriage rather than the presence of an undeniable causation, it did not stop women's recreational magazines such as Refinery29 (Corbett, 2020) and Teen Vogue (Nowell, 2020) from making the connection and sharing advice to their readers during successive summers of discontent and protest in the US.

7.6 In conclusion

Tear gas is used on a number of groups of people in society. They are not necessarily groups of people who are homogenous in terms of race, age, gender or health status, and over the last one hundred and ten years the spread of tear gas use has

been significant – both geospatially, temporally and in its frequency or incidence. This diffuse spread in place and time, the lack of homogeneity of the way tear gas is used by agencies deploying it, and the diverse nature of the people it is used upon is interwoven with our conclusions; that understanding the vicarious experience of tear gas use is to align it with a traumatic occurrence that perpetuates harm, inequality and fear. Tear gas has been used against soldiers and civilians, police officers and protestors: men, women and children have been affected in a multitude of ways by the deployment of tear gas. Their experience differs circumstantially - some may 'volunteer' to be exposed by virtue of being part of a military or police unit which requires training in the use of the lachrymator, or regular rehearsal with the compounds standing in for far more perilous substances that exercises help build the embodied experience (Adey and Anderson, 2012) of responding to. Many more, however, do not go knowingly into being exposed to tear gas, but encounter it when a situation has disintegrated through escalation: when protest marches or encampments meet the threshold (whether it is legitimate or not) for the deployment of CS. Fundamentally however, the circumstances behind a person's exposure to tear gas are a levelling factor, because in

Why does it matter to look at how tear gas influences memory, memorialisation and the meanings of war, violence, protest and order? What does this mean for our understanding of the impact of a disobedient and contested object? This was the central challenge to the research, embarking upon such a long-running and varied study approaching tear gas from a new angle. This thesis set out to answer the question of how and what does the various ways tear gas has been presented tell us about what it is like to experience. The process of examining retellings and recollections of tear gas use enrolled vicarious experience of its use. When we want to experience fear or horror, we don't first look to put ourselves in a position to have it happen to us directly, but through other mechanisms acting as controls or partitions, like films, books, and tours of places. The real, lived and embodied experience is distilled into a crafted version which retains characteristics of the emotional reactions lived by the participants and perpetuates a form of remembering which exists in liminal space between the original experience and that which can be felt generations later, as a mediated memory but by no means a less traumatic experience. The sources relating to tear gas use in World War I tell us that it was a terrifying precursor to harm, utilised as a mechanism to compound the effects of toxic war gases, and it wreaked death on and from the air. Tear gas, an asphyxiant as well as a lacrimatory agent, should never have been utilised

in World War I if the International Conventions and treaties had been obeyed as read - but due to the advent of modernity heralding a deadlier arms race to find a higher form of killing, tear gas became the mist of deceit: priming soldiers to meet their ultimate end by weakening their defences and resolve. Poems from the time tell of the terrifying and paralysing fear of such an invisible foe, and the painfully slow and confusing death which tear gas use, in combination with other war gases, heralded. Paintings from the era show combatants blinded or sagging under the weight of their experience, a visual metaphor for the 'shell shock' or post-traumatic stress disorder which would likely arise from and experience or exposure to war gases. Yet memorials from World War I are vague in their mentions of gas, with some even being deliberately erased to obfuscate the scale of gas used, as if by erasing all evidence of the experience, it will somehow have been less profound and traumatic, even in a landscape permanently scarred with more enduring effects of conflict.

All of the sources have something in common: addressing a painful and traumatic experience. However, it is presented: visually, textually, audibly, it tells a tale of discomfort and distress. Words may be used to convey the visceral terror of tear gas use, like 'choking' or discussions of the injuries caused. Visual representations, analysed using critical visual methodologies, show the context of fear and anger, sadness and injury. Tear gas, to the people who have experienced it, is not non-lethal, and represents a variety of abuses - control and explication of the essential criteria for life, overzealous and violent policing tactics, as well as movement and suppression through atmospheric occupation. Through the preceding examination of artwork, poetry, prose and commemorative spaces, aligned to a post-qualitative research strategy and a desire to enter the subject from a differing angle, this work has brought us closer to fully understanding the nature tear gas use, and through this to argue fervently and hopefully that the next hundred and ten years should see it consigned to the past, no longer to feature as a human experience.

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