More than Material:
The Vibrancy of the Car in the Volkswagen Diesel Scandal

by

Tyler Hale

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Abstract

This thesis pits the work of political theorist Jane Bennett, namely the theoretical paradigm of vibrant materialism, against conventional political economic approaches to material culture, and the wider political economy of automobile society. It asks, and answers, two overarching questions: what can Bennett's vibrant materialism contribute to more traditional Marxist style materialism, and what benefit can they, together, bring to discussions about material culture in anthropology? Secondly, how were the events of the Volkswagen diesel scandal of 2015, i.e. the unbridled success of clean diesel technology in the U.S., the duplicitous role of Volkswagen's 'defeat devices', and the entire network of characters involved, affected by the material composition of diesel cars and the wider political economy of automobility? I argue that Volkswagen's clean diesel cars are vibrant materials, which actively produce the subjectivities that are contrary to the ecological-sensitivity the technology is purported to advance.

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1 Chapter: Introduction

1.1 Introduction

It's no doubt that automobiles have had a staggering social and economic impact since their mass production at the advent of the 20th century, and have produced a significant trend of increasing and expanding automobile infrastructure. Revolutionary advances in transportation technology have contributed to the conditions of dependency on non-renewable fossil fuels, social isolation and urban sprawl, obesity, and pollution (Holtz, 1998). Automobiles served as the basis of a new era of manufacturing, Fordism, arguably a still-existing model of economic production. Fordism, and the ensuing growth of a society of automobile citizens, has contributed equally to changing the landscape of consumption, through employment distribution, shopping patterns, and city planning (Jackson, 1985).

The contemporary automobile market, however, has seen some significant trend reversals in only these past two years. In 2012 and 2013, people in North America, particularly of the ages between 16-35 (millennials), were driving less than they did in 2008, and far less than they did in 1983 (Tuttle, 2012). The prevailing theory of the period was of "Peak Car" – that private automotive ownership had climaxed and was now on the decline. But now in 2015, it seems that the trend has shifted again, with millennials accounting for 27% of new vehicle sales in 2014, up from 18% in 2010 (Cao, 2015). Now, with car sales rising again, the Volkswagen Group, one of the largest automobile producers in the world has damaged consumer confidence.

This abrupt reversal of the decline previously seen within the automotive industry begs some questions worthy of an anthropological inquiry: how have manufacturers, like Volkswagen , oriented the car, as a social object, towards this new generation of consumers? What can the features and characteristics of the renewed success of the automotive industry, and the

scandalous practices of one of the largest automakers in the world, tell us about how cars are constructed socially in the global north? Can the features of this new climate of resumed automobile consumption and production tell us something important about the relationship between what a car is believed to be, semiotically, what a car is made of physically, and the meanings ascribed to both specific cars and automobility writ large as created by physical/material and social forces? How can we distinguish power and agency among the participating elements of these social changes, both among the renewed consumption of automobiles and within the commercial deception of Volkswagen Group's clean diesel project?

1.2 Background

The idea for this thesis evolved over a significant period of time – as a car enthusiast myself, I was drawn primarily to investigating performance cars and the role of the material construction of cars in creating the car as a cultural symbol. In the spring and early summer of 2015 I had begun my research, exploring how modern manufacturers had started building performance cars with devices, both mechanical and digital, to translate the noises produced by the engine into the driver's cabin. It appeared that manufacturers already appreciated the fact that noises made by engines played a significant part in how a consumer feels about cars.

It had never really occurred to me before this point that with increasing technological complexity, the material composition of cars was changing significantly. I was still driving my own ten-year-old, rotary-engined Mazda RX-8 while electric vehicle technologies and low-displacement turbo applications were becoming incredibly commonplace. The new mechanical processes, however, had come with new feelings; new engines and technologies had come with new sounds and new mechanical maintenance practices, and new power had brought new sensations and constructions of speed, convenience, and motility.

I thought this way about performance cars because, at the time, I was principally engaged with reading the work of modern political theorist Jane Bennett, from the University of Santa Cruz. Bennett had published a book in 2010 titled, *Vibrant Matter: A Political Ecology of Things*, in which she argued for a more comprehensive sensitivity towards the role of things, matter, and objects within daily life – as co-constituents of the cultures we often take for granted or as the result of human intentionality. She argued that inanimate matter was not so much an inert backdrop on which the lives of humans played out, but instead actively contributed to the unique formations and assemblies of cultural values, often no less important to producing social realities than more anthropocentric approaches would entertain.

As an example for study, vehicle noises seemed perfect: vehicle insulation was more efficient than ever, and engines were getting smaller due to environmental regulations and consumer concerns about fuel prices. The inevitable result of the development was simply more subdued-sounding engines. Meanwhile companies like Lexus, BMW, Porsche, and even Ford were either programming a type of engine note 'soundtrack' into the cabin during periods of acceleration, or mechanically amplifying the engine's noise and plugging it, via a resonator pipe, into the passenger cabin. In the late-summer and early-fall of 2015, however, something else happened in the realm of automobiles that piqued my interest immensely.

In September, Volkswagen had become the focus of every automotive press source around the world – it had developed a ‘defeat device’ to allow its turbo-diesel line of vehicles to pass emissions tests while simultaneously dumping up to 40-times the legal level of nitrogen-oxides (a chief contributor to smog), as well as a dubious cocktail of particulate emissions, into the atmosphere. Not only had it become a shock based on the severity and wide-spread effect (over 11 million cars affected), but the act had been nothing short of treachery: Volkswagen’s

"Clean Diesel" technology had been winning over the hearts of the American public so substantially in the past five years, winning "Green Car Awards", and seeing rave professional reviews in comparison to other green or "efficient" vehicles. In terms of sheer volume, the public praise of Volkswagen's clean diesel vehicles was rivaled only by the howls of criticism leveled against the company in the early fall of 2015.

The more I read on the subject, the more I approached it from the perspective of material affect that drove my original research interest: was there something in the specific way these cars were built which drove this event to its conclusion? Was there something more valuable that could be understood from the harms of this social phenomenon – more than, say, the obvious critical approach to contemporary capitalism for putting profit before people? The stakes of this new project (which it was bound to become) were higher than previously – the ecological fate of the planet rather than the fate of egotistical sports-car drivers (despite counting myself among them). There was no doubt I could, at least, entertain the aspect of affective materiality against the political economic lens of analysis which appeared to be the safe choice of approach.

1.3 Approaching the Issue of Clean Diesel's Treachery

Automobiles have had a prevalent place in political economy for some significant time. John Urry, a sociologist, provides a useful synopsis of the political economy of automobility: automobility involves the quintessential manufactured commodity-object produced by leading industrial sectors and iconic entities of 20th century capitalism; it is the major item of individual consumption, and an object which produces status through sign-values; it is a machine complex, involving socio-technical linkages between the car and a mass of other technologies and industries; it represents one of the more prescient environmental issues because of the intensity of resource extraction and production of pollutants; and it is the dominant form of quasi-private

mobility through social space, and the dominant culture which sustains discourses of what constitutes the good life (Urry, 2000, 57-58).

In anthropology, conversely, automobiles have had a relatively small place up until about the year 2001, which saw the publication of Daniel Miller's *Car Cultures*, a collection of ethnographic works highlighting the varied cultural realities of cars. *Car Cultures* elucidates the humanity of the car constructed through the relationship of car and driver, each ethnographic engagement deconstructs the entanglement of aspects like race, gender, mobility, consumerism, regulation, urban planning expressed through the materiality of automobiles.

Miller and other authors (e.g. Young, 2001; Gilroy, 2001) in anthropology had validated my suspicions that cars already had a place in more anthropocentric studies of material culture, but Urry reinforced my concerns that the political economic circumstances of automobility could not be ignored. For this reason, my project was organized around some specific as well as general research questions.

First, on the theoretical side: what can Bennett's vibrant materialism contribute to more common political economic or traditional Marxist style materialism, and what benefit can they, together, bring to discussions about material culture in anthropology? Secondly, more specific and practical: how were the events of the Volkswagen diesel scandal, both the unbridled success of clean diesel technology in the U.S., the duplicitous role of Volkswagen's 'defeat devices', and the entire network of characters involved affected by the material composition of diesel cars and the wider political economy of automobility? Additionally, how is the relationship among the elements within that political economy – the legal, economic, and cultural framework of society – created by specific material interactions, some human and some not? The following is the trajectory of this thesis' effort to answer those questions.

1.4 The Logic of This Research

In chapter two, I propose my ethnography of the materiality of Volkswagen's diesel car in North America. I begin with an account of the details of the Volkswagen diesel scandal. It sets the stage for the theoretical engagements with old and new materialist approaches in social science, and establishes a basic list of characters, the network of interrelations, with which I engage: the defeat devices, diesel fuel combustion, state policies and regulations, automobiles, corporate executive structures, capital, and American cultural myths.

This first section is meant to address the first fundamental principle of Bennett's theoretical perspective: that objects produce reality independent of the meanings we give them. I juxtapose this idea against the Marxist theoretical lens which might normally be employed to explore meanings of objects in a social context: commodity fetishism, alienated consumers, and contradictions of capitalism. I employ both lenses of analysis against the details of the diesel scandal, and a key text in political economy, Sweetness and Power (1985). In doing so, I conclude that Bennett is an appropriate complement to political economy, and brings specificity to abstracted political economic elements.

In chapter three, I address Bennett's other major tenet: that the attenuation of blame spreads across networks of actants. In this section I show how, in traditional Marxism, the diesel scandal exemplifies the complexities of social classes, and the relationship between state and civil society: that the state reflects prevailing class interests and class structures, and is therefore an instrument of the ruling class, through its protection of existing modes of production and its emphasis on the maintenance of economic growth. In exploring the widened network of actants which contributed to the Volkswagen diesel scandal, through Bennett's perspective, I argue that placing the blame on one constituent over another, within networks of humans and non-humans,

is problematic. Expanding the network does contribute to a much better understanding of the range of possible relationships of causality.

In chapter four I explore the possibility that, in light of Bennett's perspective, some things are more *vibrant* than others. I concur with one of Bennett's critics, Bartolini, that social constructs (conceptions of power, gender, identity, etc.) should not be ignored in the pursuit of determining and exploring the contingencies of vibrancy. The so-called "real-world" is a point of concern in this section: Car manufacturers measure mpg and emissions based on an imagined driver, one who accelerates gently, and who drives conscientiously and conservatively; but the diesels surpassed consumer expectations because they were driven aggressively. This was conversely the reason hybrids disappointed. Regulators too, play a part in this real world – one in which green-house gasses, rather than particulate emissions, define the imminent destruction of the planet. Bennett's perspective is integral to this conclusion – that the affective capacity of the cars' materials actively produces driver's behaviours and creates a situation where active contributors to an ecologically unsustainable future of transportation go unaccounted-for.

My overall conclusions within this project are two-fold: theoretical and practical. On the theoretical side, to ask what is the value of Bennett's perspective to anthropology and to existing materially-inclined perspectives (historical materialism and political economy). On the practical side, to ask what is the value of Bennett (and new materialist) approaches to understanding both the Volkswagen diesel scandal and the political economy of automobility more generally. Concerning the first, Bennett has two major contributions: the concept of vibrancy (as distinct from vitalism) and the concept of distributive agency.

Though not necessarily a new idea, but a reframing of existing ideas, what vibrancy does is encourage further exploration of the capacity of materials to produce change and affect beyond

the semiotic (Miller, 2008; Le Vine, 2012; Miller, 2001; Best, 1970; Berger, 2001). It is an interpretive measure of a material or object's affective capacity within a network – for example, objects may be said to be more or less vibrant than others in the ranges or intensities of their tendencies and activities.

The second area of contribution, the political, is more significant. In attuning ourselves to nonhumans, and a notion of distributive agency (the idea that no single entity can be found responsible for a given phenomenon) we undertake an alternative way of approaching events that harm. While there is already a plethora of material culture studies on the contribution of materials and objects to the construction of positive cultural practices, not so much work has been done which explores the capacity of harmful events with respect to the affective capacity of materials. Bennett's approach, I argue in this work, would be most valuable in an anthropology of temporally sensitive political events, such as the Volkswagen scandal.

In the context of practical conclusions, Bennett (and her new materialism interlocutors more generally) encourage a more comprehensive engagement with the materials which contribute actively to political harms like the Volkswagen scandal and help us see how, in understanding those specific instances of harm, we can develop a much more comprehensive look at the political economy of automobility more generally. When used in the context of the Volkswagen scandal, a greater range of causally-related entities emerge: the technologies, the regulations, the corporate executives, the contradictions of capitalism, the drivers, and the diesel-engined cars themselves. Through this larger network of agents, I come to conclusions regarding the capacity of Volkswagen's TDI cars to resonate with drivers and produce the realities of automobility – through legacies of diesel in America, through driving experiences, and through co-creation of the quintessential "good car", which present important implications for

considering the future of sustainable automobiles. State regulations, corporate politics, and economic demands shape what a car is, and what kinds of cars consumers are interested in. Fundamentally, however, these feelings are opposed to a sustainable future of automobile travel. A society defined by "automobility" is political economic, but the fact that cars are ideological equivalents to ideas of modernity, freedom, and domination, is not an inherent characteristic of cars. The "car", is a car of a certain form, a particular material assemblage. Consumer currents surrounding what cars to buy are informed simultaneously by that cultural superstructure, as well as material forces (emissions regulations, cost, production cycles, aesthetics, and phenomenology). I argue that Volkswagen's clean diesel cars are vibrant materials, which actively produce the subjectivities that are contrary to the ecological-sensitivity the technology is purported to advance.

For example, we can observe how Corporate Average Fuel Economy (CAFE) and Light-Duty Fuel Economy (LDV) rules force VW to develop a US regulation-compliant vehicle, which in tandem with physical limitations created by the industrial capitalist mode of production (the physical limitations of Volkswagen chassis and model development cycles) create a contradiction: between the interest groups of society, and between corporate interests for profit and self-regulation and issues of public health concerning people and the environment.

Specific material assemblages serve to reinforce Marx's conception of alienation. Specific objects serve to alienate some through the competitive actions of those who labour to produce it, and define the identities of others – specifically those who avidly consume it. The line between fetishized commodity and the praxis through which identities and cultural knowledge is produced is blurred. These cars, however, cannot solely be understood as fetishized

commodities, rather, they actively produce the identities and behaviours of their drivers, and serve to produce unique phenomenologically-potent actors via their assemblages.

Only some cars receive "love", are anthropomorphised, are taken in and accepted as being exemplary of all the valued experiences which define the cultural phenomenon of a good or even great car. Volkswagen is integral this discussion, and its rise in popularity is inextricable from its material forms and connections, and the way these connections are articulated within ideological frameworks. This rise, still, is not external to the relationship between the state and civil society, created within the contradictions between the state's role as a custodian of prevailing economic organization and its role in mediating the interest groups of society. Additionally there is a clear indication that there are at least two "real worlds" being created: that of the manufacturers who produce the cars and of the regulatory agencies who devise "real-world" emissions-testing methods, and that of the drivers who plant their feet to the floor in order to define themselves and the cars they drive in how they drive.

2 Chapter: Volkswagen Diesel, Vibrant Matter, Commodity Fetishism

2.1 Introduction

At the first level of analysis, the scandal presents an interesting case to position Bennett's new materialism against conventional Marxist materialism. In this chapter I explore the details of the scandal: the defeat device and the small lab which discovered it, the international prevalence of the tactic, state response and intervention, the technical solutions offered and the financial penalties incurred by the company. In doing so, I establish network of objects, of things in general, within the context of the scandal, which co-produce the realities we find ourselves in.

From there I turn to Bennett's *Vibrant Matter*, and explore the first (and fundamental) of Bennett's major provisions regarding the agency of matter: that objects are "vibrant"; things produce reality independent of the meanings we, as humans, give them. Bennett asks what would happen to our thinking if we experienced materialities as actants, if people attended more carefully to their trajectories and powers. I juxtapose this consideration against prevalent Marxist perspectives, that objects and things are relegated to the status of commodities within a capitalist context: that their status within society is dependent on the meanings humans give them, which is in turn dependent on the economic organization of society and prevailing economic relationships.

Thirdly, as I argue that Bennett's new materialist approach brings both specificity to traditional political economic approaches, and a basis for a combinatory perspective (i.e. one which takes into account the capacity of non-human objects to produce meaning with us and independent of us). I explore the vibrancy of materials in Sidney Mintz's ethnography of sugar. The purpose of this exercise is to elaborate upon further implications of material vibrancy within traditional political economic approaches.

My overall task in this chapter is to expand upon the political economic approach to the diesel scandal, and question the completeness of that perspective in the context of the idea that objects, materials, and things, participate in shaping the dynamics of the diesel scandal and therefore effectively, the dynamics of state capitalism. In entertaining the agency of objects, I reveal a much larger network of participants to explore in terms of allocating responsibility for the harms created by the scandal. My conclusion, in this second chapter, is that Bennett's concepts are an appropriate complement to political economy, and brings specificity to abstracted political economic elements. In applying Bennett's perspective, there is more to be seen in the material assemblage of the Volkswagen issue than a political economic reading would provide alone. It forces us to ask questions which may not have been otherwise considered.

2.2 Methodology

The methodology for this section, to reconstruct the facts of the Volkswagen diesel scandal, emphasizes the repeating threads of industry narrative. Exclusively, I base this story of the events on major automotive industry publications and news sources, including *Cars.com*, *The Guardian*, *The Atlantic*, *Motor Trend, The Wall Street Journal, The British Broadcasting Corporation,* and *Canadian Broadcasting Corporation*. This approach emphasizes the repeated, most consistently reported, elements of the story. Other, lesser-known, news sources such as *Auto Blog*, *Auto Guide*, and *Consumer Reports*, serve to support and compliment the over-arching story line.

The methodology implemented sought to find a diverse range of news sources. The sources used to construct the facts of the Volkswagen story are diverse in authorship and approach to the facts of the story, drawing on publications with financial, consumer, industry,

public health, and corporate lenses of journalism. Again, drawing on this diverse range of sources for the common and repeated threads of the event is a way presenting the facts as presented in mainstream media accounts. Articles collected and reviewed spanned from September 2014 to April 2016, with most written between October 2014 and October 2015.

The data collected is presented here in the form of a timeline, with much of the story centering on a few accounts to keep the presentation of the material consistent. It is important for the reader to note that repeated citation and use of a few key sources is only due to their focus on those key elements of the story, and to aid in telling a consistent and well-flowing narrative. Most, if not all, of the content articulated in those few key sources cited frequently in this section reflect those threads that emerged as most common in other sources explored.

Generally, industry accounts did not stray from those presented in journalism. Exceptions to this were mainly in the emphasis on affected parties. For example, *Bloomberg* and *The Wall Street Journal* tended to emphasize the aspects of the scandal that most affected the state of the industry in terms of financial stability, while those like *The Guardian* and *The Atlantic* focused more on what the elements of the scandal meant for consumers and the general public. Despite these differing emphases on impacts, the narration of the details of the scandal and its occurrence was generally consistent among sources.

Due to the reliance on journalism and industry reports, the narrative of the scandal takes a very specific shape. The notion of a "scandal", as a rhetorical device, defines the actions of the event before the reader begins to grasp the complexity of its details. For this reason, the idea that the actions taken by Volkswagen in this event do not rather constitute some other kind of malfeasance (e.g. a fraud, a scam, a hoax, etc.) is an important perspective which emerges in the

narratives analysed. Had the issue been approached from a different set of source materials, perhaps this underlying rhetoric would be different.

2.3 The VW Diesel Scandal

In May 2014, at a small research lab at West Virginia University, research assistant professor Arvind Thiruvengadam and his colleagues tested and experimented on a 2012 Jetta TDI and 2013 Passat TDI – the turbo diesel-powered vehicles in Volkswagen's (VW) lineup (Glinton, 2015). West Virginia University's Center for Alternative Fuels, Engines, and Emissions (CAFEE) was hired by the International Council on Clean Transportation (ICCT) to do performance testing on clean diesel cars in the U.S. after Volkswagen had been boasting about its environmentally friendly and fuel efficient diesel cars. They had learned of some discrepancies in the emissions of several Volkswagen diesel vehicles in early 2014 and their intention was to develop a control model, noting that the U.S. had stricter and more rigorously enforced emissions laws that Volkswagen's TDI-equipped cars routinely passed without problems. The testing conducted at CAFEE found that in real-world road-test scenarios, the Jetta exceeded the U.S. nitrogen-oxide emissions standard by 15 to 35 times, and the Passat by 5 to 20 times, in comparison with Environmental Protection Agency (EPA) and California Air Resources Board (CARB) testing results of the same vehicles (Lam, 2015; Wendler, 2015).

The findings prompted an investigation and discussions by CARB and the EPA with Volkswagen (Young, 2015). Volkswagen argued that discrepancies between real-world emissions findings and the CARB testing findings were caused by technical issues (Lam, 2015). On July 8, 2015, CARB shared the findings of its investigation, discrepancies presumed to be caused by software within the electronic engine control computer, with VW: none of the technical issues suggested by the automaker were found to explain CARB's results. Between July

8 and Sept. 3, CARB and the EPA said they would not certify VW's 2016 diesel lineup, a necessary step to put those cars on sale in the U.S. Only then did VW admit that the software calibrations in the diesel emissions systems contained "a second calibration intended to run only during certification testing" according to CARB (Wendler, 2015).

On September 3rd, 2015, CARB announced that Volkswagen had admitted to installing and implementing a so-called “defeat device”, which was active in the diesel models of Volkswagen’s vehicle lineup (Mays, 2015). The device, which is not external to the engine’s computer, but a software program contained within it, was activated by certain aspects of the vehicle’s operation cycle as parameters which would define when the engine should operate on an EPA-favorable cycle (i.e. during testing). For example, the software would sense the absence of steering-wheel movement, the deactivation of the traction control (routine during testing), and the movement of only the front wheels instead of all four (as conducted during testing procedures using “rolling roads”) (Wendler, 2015).

Essentially, the software detected external inputs as references to the state of the vehicle’s operating environment (as either in an EPA testing scenario or real-world driving) and turned the emissions controls on for EPA testing and off for real-world driving. Understood as part of the presumed benefits of turning off the controls for normal driving, this includes improved fuel economy and engine power for the vehicle (Wendler, 2015). What the defeat device meant for real-world conditions is that when the car is not being tested, the "road" calibration decreased the effectiveness of two types of emissions-treatment systems: nitrogen oxide traps and selective catalytic reduction via a urea solution. When in reduced effectiveness, the systems allowed the engine to emit nitrogen oxide levels that were 10 to 40 times the allowable amount by the EPA (Mays, 2015a).

In mid-September, 2015, the EPA had concluded that such software constituted an auxiliary emission control device (AECD), and stated that VW had therefore violated the *Clean Air Act*. The cars in question, in retrospect, should not have been EPA-certified, and the U.S. Department of Justice was allowed by existing laws fine the corporation up to US$37,500 in civil fines per vehicle. In total, that means VW could have been facing fines ranging up to US$18 billion for the 486,000 vehicles that Volkswagen had admitted to being involved (Mays, 2015b). As a result of the ruling, VW ordered dealers to stop the sales of all four-cylinder diesel cars, as well as the four-cylinder diesel Audi A3 (Audi being a luxury brand in the Volkswagen Group corporation), which was also believed to be affected by the defeat devices (Mays, 2015b).

While 500,000 vehicles were believed to be involved in the US, by the end of September, VW announced that approximately 11 million diesel cars worldwide had had the same "defeat device" software that evades emissions testing installed and activated. Following the admission, the automaker had said it would set aside €6.5 billion to cover the cost of fixing affected cars (Mays, 2015a).

In an effort to appease the public, then CEO of VW Group, Martin Winterkorn resigned, saying in a statement that he was unaware of any personal wrongdoing but accepted responsibility for the crisis. Additionally, Winterkorn said his resignation would clear the way for a "fresh start" at Volkswagen (Mays, 2015). Winkerton left Volkswagen with a €28 million pension after falling on his sword for the company (Topham, 2015).

Similarly, Volkswagen Group of America returned three Cars.com awards for the TDI clean-diesel versions of its vehicles. Volkswagen returned both the 2015 “Best Bet Award" for the Jetta TDI and the “Eco-Friendly Car of the Year” awards for the Passat TDI in 2012 and 2015 (Mays, 2015b). Succeeding Volkswagen CEO Matthias Muller announced plans to launch

a recall in January 2016 of millions of cars around the world involved in the diesel-emissions scandal, saying that the automaker hopes to have all of the vehicles repaired by the end of 2016. Later, in November of 2015, Volkswagen mentioned it would try to regain consumer favour by offering up to $1000 to affected owners, along with an extension of road-side assistance services (Mays, 2015b). Internationally, the response to the event was extreme. Switzerland banned the sale of VW's diesel cars entirely, while former UK science minister Lord Drayson admitted that the Labour government's support for diesel cars was a mistake, and warned that diesels are "literally killing people" (Ruddick, 2015; Kollewe, 2015a). Similarly, the EPA and CARB announced they too would need to be more diligent in their testing and certifications. The EPA announced it had plans to spot-check other light-duty diesel vehicles for *Clean Air Act* compliance (Mays, 2015).

In early October, President and CEO of Volkswagen Group of America, Michael Horn, appeared before the U.S. House Energy and Commerce Committee, and withdrew suspect 2016 diesel models from emissions-certification consideration. In a statement, Horn outlined a general plan to remedy the crisis, hold responsible parties accountable and guard against future breaches of trust. The fixes proposed effectively concerned three distinct generations of diesel engine technology and implementation, each concerning hardware (physical exhaust treatment filters) and software uniquely (Mays, 2015). He remarked that affected owners will still achieve their cars' EPA-rated gas mileage after the fix, but there might be a "slight impact on performance" (Mays, 2015c).

Just one month later, as a result of its increased efforts for oversight in maintaining *Clean Air Act* compliance, the EPA announced that additional testing had uncovered additional defeat devices in Volkswagen's 3.0-liter V-6 diesel engines. Officials issued a notice of violation for six

more vehicle models: the 2014 Volkswagen Touareg and 2015 Porsche Cayenne SUVs, plus the 2016 Audi A6 and A8 sedans, A7 hatchback and Q5 SUV. Porsche, like Audi, is a Volkswagen Group brand. As a result, Audi, Volkswagen and Porsche told dealers to stop selling all six models identified as non-compliant by the EPA, plus the Audi Q7 SUV, which also has a 3.0-liter V-6 diesel (Mays, 2015a).

In January of 2016, the U.S. Department of Justice collected all the information it had and sued the Volkswagen Group, including its subsidiaries Audi and Porsche, for violations against the *Clean Air Act* for every U.S. diesel vehicle sold since the 2009 model year. The lawsuit covered approximately 584,000 vehicles and marked what the EPA called "an important step to protect public health" (Mays, 2015c).

In its admission, the automaker group revealed that its own internal investigation into the causes of its own breach of government emissions regulations uncovered weak company processes, individual misconduct and a mind-set in some parts of the company "that tolerated breaches of rules" (Mays, 2015a). Additionally, VW said that during the production cycle of the automobiles in question, it had proved "impossible" for the 2.0-liter diesels in various 2009-2014 VW and Audi TDI models to legally meet the EPA's stricter (than within the company's European domestic market) nitrogen oxide emissions requirements "within the required time frame and budget" (Mays, 2015a). In an effort to produce the vehicles on schedule, the company claimed it had developed software that restricted emissions only under testing circumstances. Later on, well into the marketing and selling of the vehicles, more efficient exhaust-gas treatments to reduce nitrogen oxide had become available. According to the automaker, however, it didn't use them to their full extent (Mays, 2015a).

Although U.S. lawsuits like this are typically settled at a fraction of the theoretical maximum penalty, analysts said that the size of the claim meant Volkswagen could face a larger bill than previously anticipated. While the 11 million cars would not be subject to the suit laid on VW by the U.S., according to a Reuters review of the U.S. complaint, VW could in theory face fines of as much as $37,500 per vehicle for each of two violations of the law; up to $3,750 per "defeat device"; and another $37,500 for each day of violation. As of January 2016, illegal devices to impair emission control systems were installed in nearly 600,000 vehicles in the United States, bringing the total eligible judgement to US$48 billion (Prodhan, 2016).

Based on the events, the lawsuit had been expected, and analysts believed that any fine would be far below the theoretical maximum. For example, when U.S. authorities sued another car manufacturer, Toyota, for up to US$58 billion for environmental violations in the early 2000s, both parties agreed to a settlement out of court that cost the Japanese carmaker a paltry US$34 million, 0.06% of the maximum eligible penalty (Prodhan, 2016).

Despite the lack of severity with which federal fines are levied against companies on these grounds, Volkswagen and affiliated brands have taken significant financial hits through the dynamics of finance capitalism and investor confidence. In September, shareholder reaction to the emerging lawsuit was instant, and resonated strongly among the buyers and sellers of company stock – public investors. Within minutes of the Frankfurt stock exchange opening on the Monday following the announcement of corporate non-compliance and deception, €15 billion was wiped off VW's share price as it plummeted 20% (Kollewe, 2015). In total, the company's share price has dropped over 30% of its value since its pre-scandal levels in September 2015 (Ruddick, 2015). Similarly, the Porsche luxury car brand has seen a severe dip in its profits, falling from €3.03 billion in 2014 to a projected €0.8-1.8 billion in 2016 (Agencies, 2015).

So far, the attention the scandal has brought to Volkswagen and diesel automobiles specifically has extended into investigations of gasoline vehicles, and vehicles made by other brands outside the VW family. An internal investigation by VW into the diesel emissions issue discovered that CO2 and fuel consumption were also "set too low during the CO2 certification process" (Ruddick, 2015). Worth mentioning, however, was that only the "majority" of cars involved had a diesel engine, implying that non-diesel (gasoline) cars had been involved in the manipulation of emissions information (Ruddick, 2015). Details are uncertain, but estimates on the number of cars affected ranges from 36,000 to 800,000 (Ruddick, 2015).

Additionally, the investigations have spread to other manufacturer brands, under suspicion that they too may have been manipulating emissions testing in similar ways. In Germany, Kraftfahrt-Bundesamt (KBA), a regulatory body, in accord with Germany's transport minister, Alexander Dobrindt, said in a newspaper interview that diesel vehicles, including those from foreign manufacturers, would be subjected to "strict checks" (Reuters, 2015). Twenty-three manufacturers have been suspected of the same kind of tampering, including major Japanese and North-American brands (Reuters, 2015).

2.4 Vibrant Matter

Bennett`s task in *Vibrant Matter* (2010) is to encourage an engagement with things and the capacity of things "…not only to impede or block the will and designs of humans but also act as quasi agents or forces with trajectories, propensities, or tendencies of their own" (Bennett, 2010, p. viii). She makes the argument that all matter is pulsing with life – that all things are not simply alive in a mechanistic sense, nor are they infused with a kind of non-material spiritual essence. Things are alive, however, in the way they exist in complex interrelationships, entanglements, and propensities for change. Her purpose is to present an alternate way of

conceiving and perceiving politics. Traditional political theory, she argues, has always "referred to human social structures or of the human meanings embodied in them and other objects" (2010, p. xvi). This is because politics has always constructed itself as an exclusively human domain, wherein materiality only registers as the material constraints on or a context for human action.

Bennett looks to conceive of a kind of thing-power, "the strange ability of ordinary items to exceed their status as objects and to manifest a kind of independence or aliveness, constituting the outside of our own experiences" (2010, p. vxi). These objects possess a certain effectivity of their own, independent of the words, meanings and feelings they provoke in us. Bennett looks to continue the dissolution of the passive object and active subject binary by rethinking agency and life through a Latour-derived sense of the actant (Latour, 1996), in which objects are alive because they have a capacity to produce effects, induce difference and change, and participate in shaping the web of interrelations in which they reside (2010, p. 6). Actants here are defined as "a source of action that can be either human or nonhuman; they are that which have efficacy, can do things, have sufficient coherence to make a difference, produce effects, alter the course of events" (2010, p. viii). This means of course that humans, as complex materialities composed of various interrelated components, some organic, some not, and residing within complex material assemblages, cease to be totally autonomous or sovereign political actors.

But actants never act alone, and Bennett illustrates this point with the concept of distributive agency, which "does not posit a subject as the root cause of an effect" (2010, p.31). Distributive agency is distinguished from other traditions that define agency as a moral capacity in connection with "an advance plan or an intention" (2010, p. 31). As Bennett puts it:

> There are instead always a swarm of vitalities at play. The task becomes to identify the contours of the swarm, and the kind of relations that obtain between its bits… this understanding of agency does not deny the existence of that thrust called intentionality, but it does see it as less definitive of outcomes. It loosens the

> connections between efficacy and the moral subject, bringing efficacy closer to the idea of the power to make a difference that calls for a response (2010, p. 32).

Agency, for Bennett, is tied to directionality, but not necessarily intention, rather a "trajectory, a directionality or movement away from somewhere even if the toward-which it moves is obscure or even absent" (2010, p. 32).

Actants, and the agency distributed among them in directionalities, are necessarily human and non-human assemblages of things; "…Productive power that has engendered an effect will turn out to be a confederacy, and the human actants within it will themselves turn out to be confederations of tools, microbes, minerals, sounds, and other 'foreign' materialities. Human intentionality can emerge only by way of such a distribution" (2010, p. 36). Assemblages are not governed or guided by any one materiality, nor are its effects singularly determined. Assemblages, rather, have emergent properties in their ability to make something happen which is distinct from the sum of the force of each materiality considered alone (2010, p. 24). In Vibrant Matter, Bennett explores the potential of a perception of politics which includes agentic assemblages of things. Her examples, electricity, food, metal, stem cells, and worms present the cases for matter as an actant operating around and through humans.

For example, in chapter 2, Bennett explores the agentic power of assemblages with respect to the North American blackout of 2003 which affected large parts of Canada and the US, including Ohio, Michigan and Ontario. This blackout was the point of termination for a cascade of voltage collapses, self-protective system withdrawals, human decisions and omissions. Generating plants shut down during periods threatened by excess heat, or periods of extremely low voltage, as the grid includes various valves and circuit breakers that disconnect parts from the assemblage when other actants behave in certain detectable ways. As Bennett describes the event, several initially unrelated generator withdrawals in Ohio and Michigan

caused the electron flow pattern to change over the transmission lines, which led, after a series of events including a brush fire, a burnt transmission line, and several wire-tree encounters, to a successive overloading of the other lines and a cascade of disconnects. Each disconnect then placed more strain on the remaining segments of the grid still connected (2010, p. 25).

The blackout affected over 50 million people over 24,000 kilometers-squared, shutting down over 100 power plants including 22 nuclear reactors. The U.S. Canada Power Outage Task Force was more confident than other groups with respect to knowing what started the cascade, focusing on a variety of "agential loci": electricity with its internal differentiation into active and reactive power; power plants, understaffed and over-protective in their safety mechanisms; transmission wires, tolerating only so much heat before they refuse to transmit the flow of electrons; a brush fire in Ohio; Enron FirstEnergy and other energy-trading corporations who had been both legally and illegally milking the grid without contributing to its infrastructure; and the Federal Energy Regulatory Commission, whose *Energy Policy Act of 1992* deregulated the grid, separated the generation of electricity from its transmission and distribution, and advanced the privatization of electricity (2010, p. 26). With this example, Bennett reveals that "to the vital materialist, the electrical grid is better understood as a volatile mix of coal, sweat, electromagnetic fields, computer programs, electron streams, profit motives, heat, lifestyles, nuclear fuel, plastic, fantasies of mastery, static, legislation, water, economic theory, wire, wood – to name some of the actants" (2010, p. 25).

What her analysis of the ordeal presents is the notion that a confederacy of agency "does not attenuate the blame game, but it does not thereby abandon the project of identifying the sources of harmful effects" (2010, p. 37). She continues:

> Such a notion broadens the range of places to look for sources. Look to long term strings of events: to selfish intentions, to energy policy offering lucrative

> opportunities for energy trading while generating a tragedy of the commons, and to a psychic resistance to acknowledging a link between American energy use, American imperialism, and anti-Americanism; but look also to the stubborn directionality of a high-consumption social infrastructure, to unstable electron flows, to conative wildfire, to exurban housing pressures, and to the assemblages they form. In each item on the list, humans and their intentions participate, but they are not the sole or always the most profound actant in the assemblage (2010, p. 37).

Bennett's other chapters make similar arguments, for example food in chapter 3 invokes a notion of food as an active agent, as non-human inorganics and non-human organic agents work with and through human actants to influence mood, meaning, decisions and dispositions (2010, p. 50).

In Chapters 5, 6, and 7, Bennett approaches the heart of her task – the theoretical principle which emerges through rethinking things: what would happen to our thinking about nature if we experienced materialities as actants, and how would the direction of public policy shift if it attended more carefully to their trajectories and powers? In Chapter 6, she illustrates this thinking through stem cells, the culture of life, and acts of pre-emptive aggression in the form of the Iraq war. As Bennett discusses, at the beginning of the 20th century, Americans found themselves in various debates concerning the constitution and moral conditions of life in response to discoveries in cellular biology and embryology. The debates were both scientific and moral: abortion, artificial life support, and embryonic stem cell research, i.e. issues regarding the "culture of life" (2010, p. 82). The culture of life position, which Bennett calls a soul-vitalism of matter, has been invoked to support legislation to keep a feeding tube inside a woman without brain function, to restrict access to abortion from minors, and suppress funding for embryonic cell research. This soul vitalism is more anthropocentric, a firm moral ranking of vitalities, with the most vital (humans) at the top, with those at the top obligated to protect those closer to the bottom in a kind of paternal relation. The same kinds of relations which allow the culture of life politic to be invoked in launching pre-emptive violence like the Iraq war in which claims of

natural hierarchy extended towards ranking humans in their degrees of freedom (2010, pp. 85-88).

Bennett argues that this approach, an assessment of the hyper-extension of culture of life politics, begetting a sense of a human freedom hierarchy, as one social explanation for how those inside culture of life politics constitute the invasion of Iraq as an act of the strong caring for the weak and offering they who are weak the gift of higher forms of vitality through greater degrees of freedom, is actually a common interpretive avenue in social science (2010, 88). This approach, however, is far too human centric, focussing on the interplay of human beliefs and practices. For Bennett, as she argues, a richer account of the events would

> …Treat the culture of life as an assemblage of human and nonhuman actants. In it, the human belief in a cosmic hierarchy presided over by an Almighty patriarch, the human feeling of pity for the weak, and the human pleasure taken in acts of aggression and violence would congregate and join forces with pluripotent stem cells, ultrasound images of unborn fetuses, the impersonal momentum of American empire, and the spectacular fires and explosions in Iraq (2010, p. 88).

In the penultimate chapter, Bennett's work culminates in the form of a question, illustrated through stories of worms and the human body: what is the political capacity of actants? She discusses Darwin, who in *Formation of Vegetable Mould through Actions of Worms with Observations on Their Habits* (1881), describes how worms create history through making vegetable mould, making possible an earth hospitable to humans, cultural artefacts, rituals, practices and all of the endeavors of human history (2010, p. 95). That same mould is also responsible for preserving those artefacts, burying them beneath the mould and earth. Worms, as Darwin describes them, inaugurate human culture, and "working alongside them", help preserve what they have together made (2010, p. 95). These contributions are by no means intentional, though nonetheless beneficial to humans – the exertions of the worms and their contribution to human culture remain an unplanned result of their action in competition and cooperation with

other actants chemical, biological, human, and other. Worms, as much for Bennett as Darwin, represent small heterogeneous assemblages, within which agency has no single locus.

Darwin remarks on the behaviour of worms, and how their actions appear to be prospective endeavors, for example in plugging up the holes of their burrows with leaves. In their action they make apparently free "or at least unpredictable" decisions based on the available materials they find, adjusting technics of bodily organization to the particular set of circumstances they find themselves in and its distinct possibilities (2010, p. 96). Their "freedom" is further substantiated by their overriding of believed impulses (such as aversion to bright lights) during activities of apparent concentration (breeding, dragging leaves, eating).

As a similar example of agentic worms playing a larger role than first suspected is cited by Bennett, this time from Latour's *Pandora's Hope* (1999). In *Pandora's Hope*, Latour and fellow scientists attempt to explain a threshold of clayed earth between the savanna and the forest of the Amazon. In attempting to ascertain whether it was the forest encroaching on the savanna or vice-versa, Latour and the scientists eventually concluded that worms had gathered for some reason at the border of the two biomes. These worms had produced an abundance of aluminum in their excrement, transforming the cilia in the sandy soil into the clay more amenable to the trees of the forest (2010, p. 97). The example again illustrates a kind of acephalous assemblage of actants within which the key operator is difficult to single out. As Bennett writes: "these various materialities do not exercise exactly the same kind of agency, but neither is it easy to arrange them into a hierarchy, for in some times and places, the "small agency" of the lowly worm makes more of a difference than the grand agency of humans" (2010, p. 97).

Bennett's perspective asks us to reconsider how we understand the Volkswagen scandal: how do cars and green-house gasses affect capitalism, social classes, regulatory agencies, and drivers, and importantly, how do they do so beyond their traditionally conceived-of capacity as commodities? At this point, I present a brief review of that traditional Marxist perspective, which acts as a stark contrast to a perspective which argues that materials have agency beyond human meanings.

2.5 Commodities, Alienation, Competition, Contradictions

The commodity is an integral concept within the historical materialist perspective, which identifies the link between objects as physical matter and their ideological or culturally constructed meanings within a state-capitalist society. By extension, I cannot discuss the commodity without elaborating on what Marx thought to be alienation of man from his species-being. This alienation is bound in the commodification of objects, and labour, within the capitalist political economy as the mode of production under capitalism produces an ideology concerning the value of things and people. This alienation, however, is predicated on a moral position that Marx held about species-being, what he believed to be the true embodied potential of a person or people to self-actualize through their labour in a kind of praxis.

For Marx, the commodity is a property object which satisfies human wants, whether such wants "spring from the stomach or from fancy" (Marx, 1887, p. 26). It is described by Marx as containing two characteristics: use-value and exchange value. In the political economy of capitalism, it is the utility of that thing which creates its use-value: such value is limited by the physical properties of the object, and has no existence beyond that, existing independent of the labour required to appropriate it. Use values only come into existence through consumption, they

constitute the substance of all wealth, whatever the social form of that wealth, and they constitute the material "depositories" of exchange value (1887, p. 26).

Exchange value, for Marx, is a quantitative proportion through which values of use of one kind can be exchanged for those of another kind. This relation, however, is constantly changing through time and space as the means of measurement and the value of use changes. Exchange value appears to be something accidental and purely relative as a value inseparable from commodities (1887, p. 26).

As use values, commodities are of different qualities – take for instance Marx's example of corn and iron, which themselves are used in two very different applications of human life. In exchange, two qualities are made equal by their exchange value, through a common measurement of quantity. Take for example again corn and iron: the proportions in which they become exchangeable can always be presented by an expression in which a given quantity of the corn is equated in exchange with another given quantity of iron. The expression reveals that the common unity between both commodities is quantity. Commodities are, therefore of different qualities in their use value, but as exchange values they embodied merely different quantities, and consequently in Marx' argument, do not contain any use value. For Marx then, these objects of exchange have only one common property left – that they are objects of labour (1887, p. 27). Labour is then for Marx, the process through which use-values undergo a change into abstractions of that use-value (1887, p. 28). Commodities, in which equal quantities of labour are embodied, have value, but Marx distinguishes the creation of use and exchange value in qualities of labour: between abstract and concrete labour. The former is taken from the socially-necessary labour time which valorizes objects and governs exchange value, while the latter constitutes the metabolic interchange with the earth that produces use values.

According to Marx, a thing can of course have a use-value without exchange value in whatever case its utility to a person is not due to labour. So too can a thing be useful and the product of human labour without being a commodity, as whoever satisfies his wants directly with the products of his own labour creates use values but not commodities. Exchange values arise from the production of use values for others, in Marx' terms, "social use values". "To become a commodity, a product must be transferred to another, whom it will serve as a use value, by means of an exchange" (Marx 1887, p. 29).

By being exchanged, the products of labour acquire, as values, one singular uniform status distinct from the varied forms which emerge intrinsic to use values. Since the producers of commodities do not come into social contact with each other until the exchange, the specific social character of each producer's product does not show itself until that time. As such, the relations between individuals of society appear not as relationships of work, but as material relations between persons. This conceptualization of labour and exchange is integral to Marx's "commodity fetishism", which arises from this manifestation of the industrial division of labour. In Marx' view, "the labour of the individual asserts itself as a part of the labour of society, only by means of the relations which the act of exchange establishes directly between the products, and indirectly, through them the producers" (1887, p. 47). Commodity fetishism therefore transforms the subjective and abstract aspects of economic value into objective, real things which people believe to possess intrinsic value. As the social form of labour is mediated through market exchange, in Marx' argument, it masks the true economic nature of the human relations of production (1887, p. 48-49).

In the *Manuscripts*, Marx developed an idea of alienated labour based in wage labour, derived from a critique of political economists, whose presupposition of private property rights

as positive law begets, in Marx's argument, two classes of persons – property owners and property-less workers ([1844] 1874, pp. 295, 322-323). His critique of political economy can be summarized in his first few lines of writing: "wages are determined by the fierce struggle between the capitalist and worker. The capitalist inevitably wins" (1874, p. 282). For Marx, the worker, as a sub-human object, is in the most precarious position, as the workers necessarily lose from all conditions of a society, whether the overall wealth of society is decreasing, increasing, or terminal (1874, p. 283). It is the labour of the worker under this assumed mode of property which objectifies him and his labour in the production of objects to which he has no claim but the "pittance" offered to him by the capitalist to reproduce himself in the regime of productive relations:

> The object that [wage] labour produces, its product, stands opposed to it as something alien, as a power independent of the producer. The product of labour embodied and made material in an object, it is the objectification of labour. The realization of labour is its objectification. In the sphere of political economy this realization of labour appears as a loss of reality for the worker, objectification as loss of and bondage to the object, and appropriation as estrangement, as alienation (1874, p. 324).

It is in this, that Marx asks, "What is the meaning, in the development of mankind, of this reduction of the greater part of mankind to abstract labour?" (1874, p. 289). In the *Manuscripts*, Marx explores four types of alienation: alienation from the product of labour, from productive activity, from the human species, and from other human beings ([1844] 1874, p. 324). Alienation from the product of labour is described as being when human beings become estranged from the things they produce. In contrast to feudal forms of production, in which products hold a use value for those who produce it immediately, connecting them to the product in a way emphasized by the reproduction of life, the material labour under capitalism produces for exchange value rather than use. In this scenario the producer holds no connection to the product, because it is an abstract means of satisfying the workers' reproductive needs – it is essentially detached from the

labourer and actually confronts him because it does not belong to him. The connection of identification between the producer and the product is broken in capitalism, where as in feudalism it is reaffirmed by the relationship of self-identification through use value ([1844] 1874, pp. 324-326).

The alienation from productive activity occurs when human beings lose control over the capacity of their labour to self-actualize. For Marx, wage-labour is a mode of action through which the worker appropriates nature which objectifies that labour and makes it external to himself (1874, p. 326). In Marx's words, the labour "does not belong to his essential being; that he therefore does not confirm himself in his work, but denies himself, feels miserable and not happy, does not develop free mental and physical energy, but mortifies his flesh and ruins his mind" (1874, p. 326). Labour, under capitalism, is not the satisfaction of a need, but a mere means to satisfy needs outside itself. Its external character is presented by the fact that this labour is not the labourer's own, it belongs to someone else. Essentially, alienated labour is activity which has broken its connection to the self-affirmation and self-definition.

Alienation from the human species is dependent on Marx's conception of species-being. Marx thought that humans have qualities that make them qualitatively different from other species, namely that they have conscious mental being, the ability to take into account themselves, reflect on their own circumstances philosophically, and be conscious of themselves in history ([1844] 1874, pp. 327-230). For Marx, species alienation is caused by the transition of labour from a self-actualizing practice into a purely physical act, converting conscious being into physical being which reduced human labour into animal labour.

The crux of the argument is a humanist one, not a strictly economic one. For Marx, "man makes his life activity itself an object of his will and consciousness. Estranged labour reverses

the relationship to that man, just because he is a conscious being makes his life activity his being" (Marx, 1874, p. 328). Marx's argument relies on a conception of what humanity is, and how he consistently argues on the basis that production is the active species life, and therefore the objectification of labour is the objectification of that species life (Marx, 1874, p. 329).

The final form of alienation is from fellow humans, which emerges, as Marx argues, when the sole aim of life is competition, and all social relationships are reduced to economic transactions. In so far as industrial capitalism compels individuals to compete with one another, it so too compels them to isolate themselves in order to pursue their private interests for economic gain. Similarly, Marx argues alienation makes only one class the benefactor of this competition ([1844] 1874, p. 330).

2.6 Sidney Mintz, *Sweetness and Power*: Combining Materialisms

Mintz' project in Sweetness and Power is an ethnography of sugar, an anthropological history of sugar, spanning from 400 BC to after the industrial revolution. In it, he traces production, consumption, and power as inevitable interrelations of sugar and people throughout history. Mintz' work is typical of the historical materialist approach, exploring all of the facets of the theoretical paradigm explained in this chapter through the international commodity chain of sugar production to consumption: the dialectical approach to history, the relationship between base and superstructure, social class, a Marxist conceptualization of the role of the state within burgeoning capitalist societies, and the production of asymmetrical power structures between social classes within civil society.

His work also highlights, although perhaps inadvertently, the concerns of the contemporary "new" materialist approaches within ethnography within his conventional political economic anthropology. The most important parts of his work, emphasized in this section, is the

inclusion of new materialist methodologies and theorization into existing "old" materialist approaches. For this, I address Mintz' chapters concerning production and consumption.

2.6.1 Production

One of Mintz' critical arguments regarding the production of sugar was that it was exemplary of a kind of protean form of industrial capitalism (Mintz, 1985, p. 50). In contrast to what others at the time of Mintz' writing were inclined to believe regarding industry as emergent only in post-feudal Europe, he believed that due to a number of factors, the development and persistence of cane sugar plantations were perhaps some of the first instances of agro-industrial production (1985, p. 51).

First, sugar played an important economic role in the organization of productive factors, namely the inseparability of the field and the mill, which fell under the command of a single authority and schedule based on the necessary sugar production processes (1985, p. 51). The second feature which Mintz' argues as being proto-industrialist was the organization of the labour force, which was part skilled and part unskilled, organized synchronously around the productive goals of the mill, and largely composed of interchangeable (homogenous) labourers (1985, p. 51). The third feature was that production was time-sensitive: the production of sugar was dictated by the nature of the sugar cane and its processing requirements. This sensitivity, according to Mintz, "permeated all phases of plantation life and accorded well with the emphasis on time that was later to become a central feature of capitalist industry" (1985, p. 51).

For Mintz, this kind of early industrial production was an important step towards capitalism, not only with regard to proto-labour organization, time-consciousness, mass production, and alienated production, but also with regard to civil society, as Thomas and McCloskey point out:

> It is obvious that the colonial plantations and farms were privately profitable to their owners. The costs of the sugar preferences were borne by the British consumer and the costs of administration and protection by the British tax-payer. The costs were widely diffused, but the benefits accrued to a small group of owners who happened to be well represented in Parliament. British mercantilism during the eighteenth century was not a consistent national policy designed to maximize the wealth of Britain; nor was it a preview of the alleged enrichment of capitalist nations by nineteenth-century empires. It was instead, as Ralph Davis suggests, a means to provide revenue to the government and a device to enrich special interest groups. The truth of the matter is that what was in the interest of the Manchester textile manufacturer or the Bristol slave trade or the West Indian planter was usually not in the interest of the British economy as a whole (Thomas and McCloskey in Mintz, 1985, p. 56).

Additionally, as Mintz remarks, mercantilist policies did not always serve the same classes – at one point protecting planters' markets, at another point protecting factory owners (1985, p. 46). Nonetheless, the two hundred years of mercantilism was marked by the gradual decline of the planter classes and the usurpation of them by the industrial capitalists at home (1985, p. 46).

What is curious about Mintz' approach is the potential for conceiving of sugar as something which is agentic in its affective capacity beyond ideological considerations. As Mintz remarks, "The intrinsic nature of sugar cane fundamentally affected its cultivation and processing" (1985, p. 21). For Mintz, there is a connection between the mandatory process of sugar refinement, its end products, and the organizational structure of proto-industrial capitalist labour. What is evident in Mintz' ethnography, is the materiality of sugar and its substantial effects on the organization of labour, society, and eventually capitalism.

According to Mintz' the process for extracting and isolating the sucrose of cane sugar is very particular: the cane is crushed soon after it is cut, to avoid rot or fermentation, and cut only when it is sufficiently ripe; the process of isolating the sucrose from the crushed cane is through soaking it in water, and heating the solution to evaporate the water and produce a concentration of sucrose (1985, p. 21-23). The resulting extract is cooled, crystalizing and producing a molasses which cannot be refined further by conventional methods (1985, pp. 21-23, 47).

As Mintz remarks, from at least the early 17th to the middle of the 19th centuries, in British, Dutch, and French-established Caribbean plantations, "technological changes in the field, in grinding, and even in refining itself were relatively minor" (1985, p. 36). Much of the process of sucrose production has remained ancient, despite the emergence of animal and water powered mills for crushing the resource circa 1449 (1985, pp. 21, 27).

Relationship between cultivation of the sugar cane and its mechanical/chemical transformation derived from the inherent perishability of the crop – such characteristics also necessitated certain fundamental characteristics in the organization of labour regarding production, including pairing skilled and unskilled labour (division of labour by age, gender, condition, etc.), synchronizing the work of the fields and the mills. So too did it necessitate almost non-stop production, as the sugar cane crop's relationship to irrigation and water sources was tenuous – too little would reduce the sugar within the cane, too much would rot the cane in the ground or immediately upon cutting (1985, pp. 47-50).

Mintz remarks upon the peculiar relationship between increasingly varied consumption and increased effort into production, as if the will to continue finding and exploring new tastes reinforced the labour of production (1985, p. 64). According to Mintz, the increase in production and consumption within the British Empire must be observed as part of a much larger general movement of industrialization through the physical qualities of sugar and the necessitated extraction process that it entailed (1985, p. 63).

2.6.2 Consumption

The materiality of sugar is arguably more visible in Mintz' analysis of consumption. Mintz traces sugar's appearance in British society through several medicinal and non-medicinal consumption forms and scenarios, beginning with the 16th century exploring sugar's decorative

and medicinal uses, to the 19th century as a dietary staple of the working class. In disentangling sugar's various uses and appearances within, particularly, British consumption, Mintz concludes a number of connections between the variance and magnitude of sugar use, the rise of British industrial capitalism and colonial power structures.

By the 16th century, according to Mintz, the usage of sugar as a spice was at its peak, following which, with falling prices and rising supplies, sugar's accessibility by the middle-classes was increasing, particularly as a decorative additive for foods (1985, pp. 86-87). Part of this role in decoration came from the whiteness of pure sucrose, which is only apparent when refined to utmost purity (1985, p. 87). The intensity of labour required in refinement also meant a more expensive product. While arguably the European preference for whiter sugar may have been an emulation of the Arabic habits, as Mintz reveals, the accordance of whiteness with purity was already ancient in Europe, particularly in medicinal applications (1985, p. 87).

The correlation in European ideology of whiteness with purity was only enforced by the practice of refining sugar, which empirically reduced impurities and contaminants from the sucrose. Additionally, its inherent characteristics as a preservative when highly refined, and the ease with which other edible ingredients can be combined with it (particularly almond varieties) allowed sugar to be co-opted into the aesthetic applications of the nobility (1985, p. 88). These aesthetic food applications emerged in sculptured food delicacies inside noble courts, made into effigies of noblemen's arms, miniatures of aristocratic resources, consumed by guests, reaffirming the political clout of hosts at banquets (1985, pp. 88-91). By the middle of the 18th century, Mintz remarks on how this use was co-opted by lower classes, in part as emulation of nobler society, with coarser paste made from less refined materials (1985, p. 93).

It was in this descent into the lower classes, the proliferation of sugar, in part due to the availability of less refined (and therefore cheaper) sources of sugar, and because of falling costs more generally, as the British empire secured greater supply within colonies, that sugar's potency as a symbol of status was diminishing. This decline, according to Mintz, remained in almost perfect step with its increasing economic and dietary importance (1985, pp. 94-95). During the 18th century, the production, shipping, refining, and taxing of sugar became an immense source of power in accordance with its monetary value.

Sugar also escaped religious proscription despite its peculiar physiological effects, which were more subtle than other "drug" foods of the period, including tea, coffee, tobacco, and alcohol (1985, pp. 99-100). As Mintz remarks, sucrose seemed to have a "declining and less visible effect after prolonged or intensified use. This has nothing to do with [its] long-term nutritive or medical significance, but with visible, directly noticeable consequences" (1985, p. 100). Sugar escaped religious criticism, like its counterparts, exactly because it avoided all of the conspicuous and sudden flushing, dizziness, slurring of speech, and/or visibly intensified physical activity associated with caffeine, alcohol and nicotine (1985, p. 100).

Sugar as a sweetener rose to increasing popularity alongside other "drug" foods in Britain, notably tea (1985, p. 108). Three bitter beverages, coffee, tea and chocolate, all vied for preference in Britain during this period, with each having an effect on the fate of the other (1985, p. 109). Tea, however, eventually supplanted even home-brewed small beer almost entirely (1985, p. 110). While all three beverages initially were taken up by the wealthy, they soon became preferred by the poor, as they were well suited to the needs of people whose "caloric intake may actually have been declining in the eighteenth century, and for whom a hot, sweet beverage must have seemed especially welcome given their diet and England's weather" (1985,

p. 110). In fact, its prevalence in English society, particularly among the poorest of the working class, was only in part due to its price, which for a period was artificially high through monopoly (1985, p. 112). According to Mintz' findings, tea was more successfully "adulterated than either coffee or chocolate, apparently because it can be tolerated, even when very diluted, more readily than those other beverages" (1985, p. 112).

The success of tea, as Mintz writes "like the less resounding successes of coffee and chocolate, was also the success of sugar" (1985, p. 114). Tea was pushed hardest in British trade, in part because of its habitual consumption partner sugar, to the benefit of West Indian interest, and the connection of colony production with mainland consumption (1985, p. 114). The production of tea in India not only became a great source of profit for the empire, but also the string by which the British government maintained its hold on the colony (1985, p. 114).

For the poor, sweetening tea was a secondary use next to the supplementation of complex carbohydrates, particularly in the form of porridges and breads with cheap and unrefined treacle (1985, p. 118). While the first half of the 18th century was marked by increased purchasing power, evidence stands to claim that quality of nutrition was diminishing – tea, as a sweetened beverage, as well as the supplementation of sugar in breads and pastries "hit the spot" for the British working class (1985, pp. 118-119). During this period, "new foods and beverages were incorporated into daily life with unusual rapidity, and sugar had an important role in nearly all of these new items" (1985, p. 120). Tea, bread and porridge smeared with treacle, baked sweet cakes and pastries all gradually assimilated into not only the homes of British working class, but also into the calendar of work (1985, p. 120). In fact, as Mintz remarks, it's more likely that both tea and sugar (in combination) were consumed at work first, and later assimilated into the home,

emerging first in the reposes of daily labour, and later as a mechanism to mark time during the off-work day (1985, pp. 132-133).

Mintz calls this the "tea complex" which gradually came to define and characterize British society from the upper class to the lower class, as an ingredient in tea itself and as a fundamental ingredient in the foods that accompanied it, for flavour and preservation (1985, p. 121-123). Jams in particular began to take hold on working class tastes as sugar's price declined after the victories of free trade movements in Britain, and in accordance with the growth of pastries and tea as a British delight. Evidence of this is well documented, specifically in Scotland (1985, p. 126-127). "White bread and tea passed, in the course of a hundred years, from the luxuries of the rich to become the hall-marks of a poverty-line diet" (Burnett in Mintz, p. 129). The proliferation of jams and jellies, specifically among the poorest arose for a number of interrelated reasons: convenience of preparation, which was a significant factor for families of wives who had now engaged in the workforce outside the home leaving little time for the customary preparation of meals (1985, pp. 128, 130); overall cost; as well as the absence of any need for fuel (for cooking) (1985, p. 130). According to Mintz' research, "the part played by sugars in increasing the average total caloric intake makes it likely that sugars both complemented the complex carbs and partly supplanted them" (1985, p. 133).

2.6.3 New and Old Materialisms in *Sweetness and Power* (1985)

Mintz as a political economist, is primarily concerned with the structures of power and wealth which shift in accordance with sugar as a commodity and as a cultural "material":

> In complex hierarchical societies, "the culture" is never a wholly unified, homogenous system, however. It is marked by behavioural and attitudinal differences at different levels, which are expressed and reflected in the differing ways ideas, objects, and beliefs are used, manipulated, and changed. Cultural "materials" – including material objects, the words for them, ways of behaving and of thinking, too – can move upward or downward, from lord to commoner, or vice versa. But when

> they do so, they are not unaltered or unchanged in meaning. And it would be naïve to assume such diffusion occurs readily or as often in an upward direction as in a downward. Wealth, power, and influence surely affect the ways diffusion occurs (1985, p. 121).

For Mintz, the trajectory of British taste and culture, colonialization, power, wealth, and globalized capitalism are tied up together in the political economy of sugar. This political economy of sugar, however, does not exist without the agentic capacities of sugar as a material and its material assemblages.

Sugar as a commodity was a product of both its social character, and material characteristics. Implemented as a spice, then an integral source of calories, sugar served as decoration and sustenance across time in the United Kingdom. Its status as a commodity, which cheapened under industrialism, manifested particular use values, based in its social and physical configuration.

Concerning production, it was the intrinsic nature of sugar cane which fundamentally affected its cultivation and processing: a connection, and interrelatedness found in production, in the mandatory process of sugar refinement, and therefore in the composition of the labour (i.e. the mode of production). The relationship between the cultivation of the sugar cane and its mechanical/chemical transformation is derived from the inherent perishability of the crop. It was these characteristics that necessitated certain fundamental characteristics in the organization of labour regarding production, namely the temporal organization of the field and the mill – under the command of a single authority and schedule, based on the necessary sugar production processes. Inevitably from this material manifestation, the production of sugar is arguably the first instance of an 'agro-industry'.

In addition to the organization of the field and mill was the organization of the labourers and of the temporally sensitive nature of the work which was coordinated with industrial-like

efficiency. The labour force, which was part skilled and part unskilled, and organized synchronously around the productive goals of the mill, and largely composed of interchangeable (homogenous) labourers, existed only because of the natural characteristics of sugar. The production of sugar was dictated by the nature of the sugar cane and its processing requirements which "permeated all phases of plantation life and accorded well with the emphasis on time that was later to become a central feature of capitalist industry" (1985, p. 51). For Mintz, there is a connection between the mandatory process of sugar refinement, its end products, and the organizational structure of proto-industrial capitalist labour.

In terms of Bennett's vibrant materialism, sugar cane necessitated a particular network or assembly of agents and their organization: the cane, the field, the mill, the geopolitical relationship between colonies and colonizers, planters, factory owners, fiscal policies, slaves and free labourers. For a few reasons, we can see that a combination of old and new materialist perspectives allows us to appreciate alternative elements of Mintz' writing and also, areas for the application of Bennett to Marxist analyses. In terms of the Marxist dialectic, we can see how social development in Britain was produced in terms of changes in material conditions of existence, not in ideology, but within the context of a very specific network of material conditions, i.e. sugar formed its own network of publics together with human taste and physiology, civil society, money, class interest, alienated labour, landed property, and slavery, and how this network shifted overtime (from 800 A.D. to 1900 A.D.). In terms of the base-superstructure relationship, we can see that the mode of production is both a cause and an effect of the means of production. In Mintz' case, we see that sugar itself dictated the organization of labour, but it was the role of sugar in society which demanded its production.

Class and class structure are also products, not only of the mode of production in abstraction, but of the particular commodity being produced. Sugar for example, necessitated the combined efforts of slaves and free labourers – not technically a homogenous social class under orthodox Marxist theory, but arguably holding a common position relative to the means of production under real observable circumstances. One might argue that this circumstance is what perfectly exemplifies Bennett's conceptualization of a public, in this case, an assemblage formed in association with an activity, practice, or event. It may be worth asking the questions: can class interest permeate the distinctions created in the distinctions of slave and free labourer? Does class consciousness emerge with respect to a common label of "working class" or is it predicated on the commodity produced and therefore upon the specific assemblage of material participants?

Concerning the role of the state and civil society, Mintz' work clearly indicates that the state works to preserve the economic structure of society, and reflects the interests of the prevailing class structure. Trade policies, sugar, slavery, colonization and maintenance of dominance of those colonies are all inextricable from the state, class interest, civil society, and the maintenance and growth of the existent economic structure. From Bennett's point of view, we can ask to what degree the policies around which states organize themselves are specific to particular materials. In the case of Britain, sugar as a means of maintaining interests (economic and political) has wider implications for political decisions regarding other commodities (tea for example), or political events (such as the Boston Tea Party of 1773). Imports of tea, coffee, and chocolate all shifted in terms of economic impact and social prevalence with respect to sugar policies: relations with colonies were created and maintained in specific capacities, and the local production of beers and wines fell. Further still, social classes, domestically, were created with respect to diets created by those political actions (the tea complex).

2.7 Conclusions

The Marxist perspective clearly has some bearing on the diesel scandal. Firstly, the role of the automobile as a commodity is a tenable explanation for the alienation of public harms *vis a vis* the competition of capitalism. VW held the edge in competition because its lies and its cars produced the most attractive product. In combination it provokes a course of action which ignores public harms. This is symptomatic of capitalism and therefore representative of Marx's theory of competition which argues that competitive self-interest detracts from public well-being by alienating and externalizing the harms of the community.

By positioning my new materialist reading of Mintz's work against the diesel scandal material, there is perhaps more to be seen in the material assemblage of the Volkswagen issue than a political economic reading would provide, and more for Bennett's position to contribute to political economic analyses. It forces us to ask questions which may not have been considered: what is the relationship between the physical manifestation of the diesel cars and the scandal – is there one? How do diesel cars participate in organizing systems of labour, or cultures of consumption? How does understanding the material composition of that network provide us with more comprehensive observations, not only on the role of objects and things and their capacity to exceed their role as commodities, but also in producing other social realities in that extension, e.g. the role of the state and civil society, of social classes, and of ideologies.

Similarly, there is an estrangement of the consumer in the equation: car manufacturers produce cars, and measure their emissions, based on a specific, imagined driver, one who drives conservatively, and conscientiously. Bennett's perspective, as it pertains to the questions in the above paragraph, further uncovers this dynamic more than a Marxist perspective does alone. In

moving beyond the Volkswagen's status as a commodity, how is the material manifestation of the car active in the production of the drivers and their behaviours behind the wheel?

3 Chapter: Networks, Publics, Blame, the State and Civil Society

3.1 Introduction

Building on the ideas presented in chapter two, I expand upon the network of observable actants engaged in producing the reality of the Volkswagen scandal. First, in keeping with Bennett's theoretical paradigm, I accept the consequences of the agency of things and in doing so spread "blame" across the network of contributing actants and discuss it more detail.

Initially, VW's response to the scandal was "passing the buck", and in early October, media reported that VW's emissions scandal was the result of a handful of rogue engineers. According to Michael Horn, VW's U.S. chief executive, "This was a couple of software engineers who put this in for whatever reason. To my understanding, this was not a corporate decision. This was something individuals did" (Puzzanghera, 2015). According to Horn, two, three, and/or an unidentified number of top-level engineers were responsible, and VW employees had been suspended in connection with software that detects and fools emissions testing equipment in the company's diesel vehicles (Boston, 2015).

Automotive industry pundits have generally held that it is incredibly unlikely the situation is the sole responsibility of two or three engineers (although, more on that later), and have offered their own explanations as to the rationale behind the implementation of the cheating software. These explanations generally fall into three categories of thought: regulatory constraints on the company's overall fleet of consumer vehicles, corporate politics and product development cycles, and economic constraints tied to the competitive nature of the automotive industry and invariably, consumer values. Individually these rationales are incomplete explanations, but in combination they provide a well-rounded assessment of both the political

economic factors which contributed to the line of decision making, and the expanded network of involved actants, which resulted in breaches of both federal regulation and consumer confidence.

Taking into account the above expanded network of actants, in this chapter, I explore an existing approach to material culture studies of automobiles in anthropology, the driver-car, as well as Bennett's theoretical position on the formation of "publics". In doing so, I establish a theoretical basis for engaging with dynamics of blame and responsibility within a materialist conception of the diesel scandal, and position Bennett's perspective against existing anthropological approaches to the study of automobile material culture.

In orthodox political economy, the participants in Bennett's network are defined more abstractly, and so too is the relationship between state and civil society. Exemplified by the details of the diesel scandal, a Marxist position regarding the state and civil society is tenable. Bennett's perspective, however, adds necessary specificity to the dynamic analyzed. I explore this relationship both in terms of orthodox Marxism and more contemporary explanations of the modern political economy of automobile-centric society.

I conclude, generally, in this chapter, that it is only through understanding that things are necessarily both abstracted and physically specific, and that their specific material forms have a role in qualifying their abstracted political economic forms, that we find out where blame lands. Transitioning to the fourth chapter, I explore how these elements interact to produce blame-worthy subjectivities, not only blame worthy actants.

3.2 Expanding the Network

3.2.1 Regulatory constraints: CAFE, LDV Rules, and the Euro 6 regs.

In 2008, the EPA (which regulates emissions), the National Highway Traffic Safety Administration (which regulates fuel economy), and the California Air Resources Board (which

can set emission standards for the state of California) came up with a joint program for 2012-2017 emissions rules. Its result was a set of rules which set higher rates of stringency for cars than for light trucks, which some have argued favoured protecting the revenue stream that provides Detroit its profits (Voelckler, 2015). Unfortunately for VW, which only sells passenger cars in the U.S. with any kind of regular volume, it would be faced with much steeper hikes in emissions standards than its competitors with full range SUV and truck lineups (Voelckler, 2015). This has to do with the politics of U.S. emissions and fuel economy regulations, which is governed by both the Corporate Average Fuel Economy standards (CAFE), as well as the Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards Rule (LDV Rule). Volkswagen had to rely on its diesels to meet U.S. fuel-efficiency standards because it had nothing else.

The CAFE standards were first enacted by the U.S. Congress in 1975, in the wake of the Arab Oil Embargo, to improve the average fuel economy of cars and light trucks (trucks, vans and sport utility vehicles) produced for sale in the United States (National Highway Traffic Safety Administration, 2015). The CAFE rating achieved by a given fleet of vehicles in a given model year is the production-weighted harmonic mean fuel economy, expressed in miles per U.S. gallon (mpg), of a manufacturer's fleet of current model year passenger cars or light trucks with a gross vehicle weight rating (GVWR) of 8,500 pounds (3,856 kg) or less (but also including medium-duty passenger vehicles—such as large sport-utility vehicles and passenger vans—with GVWR up to 10,000 pounds), produced for sale in the United States. Starting in 2011 the CAFE standards were mathematical functions depending on vehicle footprint, a measure of vehicle size determined by multiplying the vehicle's wheelbase by its average track width. Additionally, vehicles produced are further subject to a "Gas Guzzlers Tax", which is

oriented towards passenger car production specifically and levied in addition to CAFE penalties (National Highway Traffic Safety Administration, 2015).

The LDV Rule instituted two separate CO2 standards (one for cars and the other for trucks, expressed on a gram per mile basis) that apply to a manufacturer's fleet of vehicles. In order to comply with the rule, manufacturers must calculate a production-weighted fleet average emissions rate at the end of a model year and compare it to a fleet average emission standard. The emission standard for a manufacturer in a given model year is therefore calculated based on the footprints of the vehicles in its fleet, and the number of vehicles produced by the manufacturer for each footprint.

For these reasons, VW as a company was forced early-on by regulatory constraints, to develop a "green", U.S.-compliant option for its vehicles, and, while some manufacturers opted for more expensive hybrid-electric options to reduce fleet emissions, VW supported development of a diesel technology which was eventually unable to remain emissions compliant under the competitive circumstances of the industry. While U.S. emissions laws were far more stringent than the company's native Europe, the company would have needed to raise the price of its vehicles (as well as decreasing the fuel economy) on a global scale to comply with standards set in just one country.

3.2.2 Corporate Constraints: product cycles, production costs, and corporate politics

The decision was, according to one writer of *Car and Driver*, "emblematic of VW's prioritization of Europe, where diesels are popular, over diesel-averse North America, a market the carmaker has traditionally dismissed as secondary" (Robinson, 2015). The theory argues that the pressure on VW engineers to deliver on a "clean" diesel technology (delivering both good

fuel economy and low emissions), was immense, and only made worse by the U.S. tighter emissions regulations (Robinson, 2015).

The timeline on the decision to follow through on the cheating measure must have happened sometime before 2009, two years after the EPA's stricter emissions standards were in full effect. The standard set extremely difficult requirements for diesels, cutting allowable oxides of nitrogen by 83% over formerly active regulations. Accordingly, the applicable regulations for the period established, by far, the toughest NOx emission standard in the world (Robinson, 2015).

Faced with penalties to its bottom line based on its fleet averages, it didn't help that VW was reliant on, what was at the time, the most effective technology to cut NOx – selective catalytic reduction (SCR). The process of SCR involves spraying small amounts of urea and water into the exhaust stream in order to facilitate the breakdown of nitrogen oxides into nitrogen and carbon dioxide. The technology, though effective, requires a tank, a pump, and plumbing, things which the vehicle platform VW was using (particularly regarding the fifth generation Golf and Jetta models) was not equipped to bear easily (Robinson, 2015). Robinson discusses the extent of such modifications:

> There's more to putting a urea tank on a car than just lashing it down with zip ties. The floorpan will likely change, the addition of a secondary filler can mean retooling a quarter-panel, and the reengineered car has to go through full crash certification. Golf [mk]V owners liked their multilink rear suspensions, a feature that probably would have to be scrapped in favor of a more compact torsion beam to leave room for the tank. (The larger Passat got a urea system in 2012, but VW programmed it so that, apart from the emissions test, it would be stingier with the urea injections, meaning that the owner wouldn't be inconvenienced with refilling the tank as often.) (Robinson, 2015).

VW was faced with a choice: either spend millions on an aging product to make its diesel engines legal in the U.S., which in 2007 was one of the smallest diesel-passenger-car markets in

the world, or cheat and provide something that would give U.S. regulators the low NOx they demanded and TDI buyers the high mileage they wanted.

According to some industry press, the short-cut would only be needed for six years, until 2014. At that time, Europe, the market that dominates VW's decision-making, would have implemented its own tough NOx standards with Euro 6 regulations (Robinson, 2015). In 2014, Euro 6 regulations would have been at the same stringency as the former U.S. regulations and by that time, the engineers and corporate executives may have figured that the company would be able to phase in more efficient and less costly NOx-reducing technology through the normal process of vehicle platform updating (Robinson, 2015). This explanation, however, does not account for why VW maintained its cheating software during the post-2014 period.

VW's story aligns the repeating narrative in automotive journalism, confirming that software-oriented cheating was, in fact, started in 2008 (Ewing, 2015). Volkswagen alleges that, at the time, it had already spent a great deal of time and money developing its engine line, known as the EA 189, which included both 1.6- and 2.0-liter versions, and which was being prepared for production. According to insiders revealing information to the *New York Times*, the EA 189 was one of the most important engines in the company, as it was destined for millions of Volkswagen-brand cars and a wide variety of vehicles from other brands under the parent Volkswagen Group, i.e. Audi, Skoda and Seat (Ewing, 2015).

Much of the story remains the same as Robinson's from that point, but what is interesting is the corporate structure which may have contributed to the implementation of the EA 189 engine line over another possible source. It has to do with two of the engineers reprimanded by VW (as mentioned above): Ulrich Hackenberg, head of research and development at premium

brand Audi, and Wolfgang Hatz, the VW group's engine chief and head of R&D at sports-car brand Porsche.

About a decade ago, Volkswagen was run by Wolfgang Bernhard. Bernhard was hired away from rival Daimler-Benz by then-Volkswagen Group CEO Bernd Pischetsrieder, and his arrival into the VW brand was not welcomed amicably (Zhang, 2015). Bernhard according to some pundits, was seen as an outsider to the group's executives and faced stiff opposition from certain VW corporate insiders, such as Audi's then-CEO Martin Winterkorn – the same Winkerton now resigned in the wake of the 2014 scandal. Apparently the tension between the two individuals was high concerning the planning phase of the EA 189 engine line (Zhang, 2015).

Apparently, with more stringent diesel emissions standards looming, Bernhard had arranged to license a clean-diesel technology called "BlueTec" from Mercedes-Benz while Winterkorn and his team at Audi submitted plans for a new diesel engine developed in-house that would become the EA 189 (Zhang, 2015). Sources from within the company have now revealed that, at the time, they felt that their native technology developments were not sufficiently capable of providing the required emissions levels (Boston, 2015).

In December 2006, Pischetsrieder was ousted and Bernhard was soon booted as well, even though his team already had a functioning prototype engine. When the dust settled, Winterkorn was became the new CEO, and he immediately appointed the duo of Hackenberg and Hatz in 2007 to oversee the development of that same EA 189 engine that entered production in 2008 (Zhang, 2015). Now, ten years later, with the EA 189 revealed as fraud, we see the results of that power struggle within the VW corporate structure, and so the story goes. Based on the way the U.S. had dealt with fines in the past, it's no surprise that VW's corporate policy

favoured taking an action which presumed low chances of being caught (it was an independent organization that detected the "cheat devices" after all) and the potential for relatively small penalties if being caught actually materialized.

3.2.3 Market Constraints: "Clean Diesel" – a brand, dependent on cut-corners

"Clean Diesel" was marketed as a "trim" level of existing Volkswagen models. For example, in 2016, Volkswagen offers three different trim levels for its Golf, "Trendline", "Comfortline", and "Highline", each representing a hierarchy of optional internal component configurations within the same vehicle model. TDI, standing for Turbocharged Direct Injection, was the clean diesel trim level available in VW's small and mid-sized models including the Jetta, Golf, Passat and Beetle, as well as its SUVs like the Tiguan and Touareg. The TDI trim provided an alternative drivetrain configuration (in this case, a diesel engine rather than gasoline) for consumers who so desired it (Volkswagen AG., 2016). Though the TDI moniker was available in both the Passat and Jetta from at least 1996, the TDI moniker was only co-opted by the brand to become its "TDI Clean Diesel" brand in North America in 2009 with the installation of its EA 189 engine line into the 2009 Jetta TDI.

TDI technology continues to be advertised by VW as economical to consumers, thrilling to drive, and full of power (Volkswagen AG., 2016). With a 2-liter engine developing 140 horsepower and up to 236 pound-feet of torque, the 2012 VW Golf TDI Clean Diesel was advertised as getting 60 mph in 8.6 seconds - faster than the comparable hybrid competition (as addressed in chapter 4). Additionally, its highway EPA rating was 42 mpg, and it had a practically unheard-of 1,000 pound towing capacity (Gordon-Bloomfield, 2011). According to an interview with the Volkswagen COO in October 2009, the diesel powertrain would absolutely out-rank hybrid competitors in terms of its provided experience:

> It's a fantastic power train. It gives very good fuel economy. It's also good for the environment because it puts out 25% less greenhouse gas emissions than what a gasoline engine would. And thanks to the uniqueness of the TDI motor, it cuts out the particulate emissions by 90% and the emissions of nitrous oxide are cut by 95%. So, a very, very, clean running engine. Clean enough to be certified in all 50 states. It's just like driving a high-powered gasoline engine so you are not giving up one bit of the driving experience that you'd expect from a regular gasoline engine (Mark Barnes in Vaidyanathan, 2009).

Volkswagen's marketing campaign was integral to the success of the clean diesel lineup, and wholly dependent on the results being generated by a product that was cheating the competition. Its marketing efforts, however, were particularly salient in the minds of consumers through an emphasis on comparisons and "debunkings" of existent diesel myths. As Branes discusses (from the same interview):

> The way we've gone about it is through a number of communication pieces. One of them we've used is TDI Truth & Dare. It is a very good website that compares some older diesels versus the current TDI clean diesel. And one of the things we do is we put coffee filters over the exhaust pipes of both cars. We let them run for five minutes and after they are done, we take them off and the older diesel product (not a VW diesel) has a round sooty spot on that coffee filter. Ours is very clean. In fact they actually make coffee out of the filter that was attached to the Volkswagen clean diesel tail pipe and they drink it (Mark Barnes in Vaidyanathan, 2009).

VW's marketing angle played on the existing place that diesel held in minds of automotive consumers. The history of diesel fuel in mainstream automobiles in North America stretches back to the late 1970s, an era of "extreme fuel price volatility and economic upheaval" (Roth, 2016). The Arab oil embargo was causing fuel rationing and a subsequent shift in vehicle design to meet new fuel economy needs – it was an economic climate in which diesel was gaining popularity (Berger, 2001, p. 107). At the time, it looked like the perfect replacement for gasoline because diesel engines were already achieving tremendous fuel economy in big trucks, machinery and agricultural equipment in other areas of the American economy (Pyper, 2012). The engines could be smoky, sooty and slow, but the trade-off was thought to be much better fuel economy, increased durability and less frequent engine servicing.

The reality of the situation, according to one particular automotive journalist, was that, in an attempt to roll out a new product quickly, General Motors ended up creating a loud, unreliable, and wholly unenjoyable car, the Oldsmobile diesel, that left American consumers with an expensive lemon and a memory of diesel as a sooty, noisy, dirty, smelly, unreliable, mess (Roth, 2016). While tax breaks in Europe facilitated the growth of much less problematic German versions of diesel engines, diesel in America retained that smeared reputation for quite some time (Pyper, 2012).

Volkswagen worked hard to reverse that idea, and its TDI Truth & Dare campaign was just one component. Other parts of the re-branding took the form of a series of video advertisements featuring three elderly women, reminiscent of *Golden Girls*, riding in a Volkswagen TDI Clean Diesel. The series was titled "Diesel Old Wives' Tales". In one commercial, titled "Three old wives get race-y", the three elderly women are riding in a TDI Clean Diesel with Volkswagen Global rally-cross car driver Tanner Foust at wheel. They endearingly flirt with him and ask him questions, like if he "likes cougars". He checks to make sure they are riding safely with their seat-belts secure, and one woman wonders why he cares, since diesel cars are sluggish. In a frame-freeze, a caption reads: "Old Wives' Tale #1: Diesels are Sluggish". Foust puts the old wives' tale to rest by whipping the car through a nearby driving course with fervor. To the sound of revving engines and tires screeching, one of the women cries out, "this is the end", and another laments her friend's decision to even ask the question about why Foust was concerned. At the end, one old "granny" claims to need mouth-to-mouth resuscitation. A caption reads on the screen at the end of the ad: "TDI Clean Diesel: That's the *power* of diesel" (Volkswagen AG., 2015) (emphasis mine).

There were nine ads in total: addressing the fact that these diesels were not only not sluggish, but not loud; they didn't smell bad; and they certainly weren't "dirty." One ad went so far as to address the fact that the diesels were also not "fuel guzzlers", which seemingly was included in order to fabricate an additional myth which the brand could then reverse for its own promotional benefit (Volkswagen AG., 2015). The ads were launched in 2013, and were intended for web-only distribution. However, they were covered by business magazines like *AdAge* and *Fast Company*, and even touted by automotive publications like *Car and Driver*, which called them "hilarious," (Ballaban, 2015). As an aside, VW now may be facing further punishment through the U.S. Federal Trade Commission, which may rule the ads as acts of 'fraud' on behalf of the company (CBC News, 2015).

Volkwagen had other initiatives running alongside its narrative reversal, including breaking two Guinness World Records for fuel economy (Ramey, 2013; Bowman, 2013) and conducting a Great Canadian TDI Clean Diesel Tour to highlight fuel efficiency (Harper, 2013). Press releases for the latter echoed much of the same persuasive tactics as the company's video ads, highlighting the fact that these diesels are nothing like that "old" diesel tech:

> All of the cars share a common powertrain, the proven 2.0-litre four-cylinder mated to a six-speed DSG transmission. While the engine's 140 horsepower (at 4,000 rpm) is not the stuff of legend, the lack of ponies is more than compensated for the torque produced, a robust 236 pound-feet of torque at 1,750 rpm. More impressive is the engine's smoothness; there's none of the marbles-in-a-steel-drum noise like older diesel engines (Harper 2013).

3.3 The Materiality of Networks

3.3.1 Affordances, and Actor-Network Theory

In 2004, Tim Dant authored an article which posited a theoretical basis for engaging with the materiality of cars, specifically through the assemblage of driver and car created in the unique paring of material automobile and material human being. Though Dant was not the first

anthropologist to engage with material objects, his article succinctly explores what would eventually be fundamental approaches in the study of material culture through the concept of affordances (semiotic resources), within a network of actants (actor-network theory), and as a medium of phenomenological engagement with the world (phenomenology). Additionally, his explanation of these approaches with respect to the automobile makes this work particularly valuable to a discussion of the Volkswagen diesel scandal.

Dant uses the concept of a driver-car to explore automobiles and automobility as an assemblage of both drivers and cars, a distinct type of social being that "produces a range of social actions that are associated with the car; driving, transporting, parking, consuming, polluting, killing, communicating" (2004, pp. 61-62). The driver-car is unlike a hybrid (such as that described by Callon and Latour) as it is not the offspring of two species of social entities, nor the permanent combination of similar types of objects (such as the sport/utility vehicle).

Despite its impermanence, the driver-car enables specific forms of action that have become habitual, affecting significant aspects of social action, in which neither the driver nor the car separated from each other could bring about the types of action that the assemblage of both can. As Dant writes: "it is in the particular ways in which their capacities are brought together that bring about the impact of the automobile on modern societies" (2004, p. 62).

In his article, Dant argues that his theoretical basis for empirical studies questions the basis for understanding social life as simply the result of relationships between human beings forming into social groups, and rather points at the possibility of the effective capacity of collaborations between human beings and material objects to contribute to the fundamental formation of societies and give them particular characteristics (2004, pp. 63-64).

Dant builds off the work of ecological psychologist James Gibson, who originally attempted to understand the process of driving a car, and published his work on the subject in 1938. Two points in particular represent the central psychological process, but indicate gaps in explanation for Dant, for which he provides his own theory.The first is the notion that the complexity of driving is beyond conscious cognitive capacity: "the driver of a vehicle overtaking another on a road with two-way traffic has to estimate the relationships between the speeds of three vehicles (her own, the overtaken, the oncoming car) and their continually changing fields of safe travel in relation to the stationary road" a process of information processing remarked as astounding by Gibson (2004, p. 64). The second is the idea that the car itself suggests an embodied relationship with the driver, as Gibson originally notes

> …a sort of field which yields a variety of perceptual cues and which invites and supports specific actions. The impressions constituting it are kinesthetic, tactual, and auditory, as well as visual, and they interact with the impressions from the terrain to produce the totality of cues on which the driving-process is based. The 'feel' of the car or the 'behavior' of the car are terms which indicate what is meant by this particular field of experience (Gibson in Dant, 2004, p. 64).

Dant draws on Gibson's later work on affordances, with the exception of their contexts, as Gibson was concerned with animals and affordances for survival in their environment. This idea, which establish the properties of material things in relation to a particular species, treats the world of objects and materials as connected in ways that are "enabled and constrained by their physical properties". Dant remarks on how the relation between objects becomes grounded in a world existing prior to human interpretation (2004, p. 65).

Dant argues that the concept of affordance is preferable to the textual metaphor (which is often employed in the social construction of technology writing), but criticizes that preference almost immediately. The affordance concept is preferable to the textual metaphor because it facilitates a realist physical relation which does not change with the needs of the observer. Yet

the realism that the concept of affordance implies is of course itself an interpretation, a post-hoc identification of possible uses; how we know that a particular object is offering a particular affordance is dependent on our knowledge of the object, specifically and certainly our textual experiences (2004, pp. 65-66).

For Dant, the concept of affordance pulls our understanding of material-human assemblages into greater physical situatedness, moving away from the mind-body dualism. The affordance concept, however, falls short of explaining the moral and social aspects of human-object interaction, as Dant writes:

> Cars may afford locomotion and mobility but the myriad range of ways they do it is not explicated by the concept of affordance. What is more, the mobility and locomotion of the car are dependent on the affordance of a driver; it would be more precise to say that it is the assemblage of driver and car that affords mobility. And the complexity of the relationship between driver and car has many social dimensions; it is designed, made, adapted, learnt, maintained, policed, changes over time and varies with cultural context (2004, p. 67).

Dant also explores the Driver-car in terms of Actor-Network Theory (ANT), which is also a constituent element of Bennett's theoretical position. Emerging from the writing of Michel Callon, Bruno Latour, and John Law, concerning the sociology of science and technology, actor-network theory prescribes the epistemological position that everything is both an actor and a network (Callon, 1987), and that everything, human and non-human, should be approached from the same analytical and descriptive framework (Callon, 1981).

From this perspective, as also described by Bennett, an actor is an actant – something that acts or to which activity is granted by something else (Bennett, 2010, p. 103). Actor-network theory is, as such, concerned with the way these heterogeneous networks of actants "define and distribute roles, and mobilize or invent others to play these roles" (Law, 1988, 285). ANT therefore studies associations in an effort to discern power through connectivity – power exerted

comes not from one thing or person, but is enacted because other actants are performing actions. Power in ANT is always an effect, never a cause (Latour, 1986, 265).

Bennett and Dant approach material objects with relative consistency given the principles of ANT as elaborated by Callon and Latour: 1) the dissection of black-boxes and the punctualization of actor-networks (Callon, 1981); 2) following system builders (the actants exerting influence over the trajectory of processes) (Latour, 1987); 3) exploring the translation of actants, and the process of making connections between heterogeneous domains (Callon, 1981). For Dant, these black-boxes are reflected in one basic network of driver, fuel-company, fuel and car to which the humans and non-humans must be contributing if the driver-car is to achieve mobility. There are all sorts of other networks entailed in this basic driver/petrol/company/car network: within the car there is a network of spark plugs, ignition system crankshafts, gears, transmission and so on; these need to be able to translate each other's actions for drive to be achieved in the wheels. At the social level the networks multiply: there must be no fuel tax protesters blocking deliveries to fuel stations, there must be a sufficient supply of crude oil being sold by the OPEC countries and there must be a system for taxing the fuel to contribute to the social costs of the driver-car. As Dant remarks, the workings of the car are black-boxed in the routine behaviours of the driver and routine performances of the car, in simple tasks like filling up and driving off. These black-boxes maintain themselves for as long as the operation continues seamlessly, and become visible only when they breakdown (Dant, 2004, p. 69).

3.3.2 Bennett's "Publics"

Bennett draws on theories of political action from John Dewey, Bruno Latour, and Jacques Rancière, and questions how we conceive of politics. Politics, for Bennett stems from reconceptualising public through the notion of "conjoint action". As Bennett writes: "a public is

a contingent and temporary formation existing alongside many other publics, protopublics, and residual or postpublics. Problems come and go, and so, too, do publics: at any given moment, many different publics are in the process of crystalizing and dissolving" (2010, p. 100). When a diverse collection of bodies collects to form a public, it is in respect to a problem, some result or consequence of prior conjoint action. "A public does not pre-exist its particular problem but emerges in response to it" (2010, p. 100). These publics and their provocations aren't under the control of any rational plan, deliberate intention, or efficient cause: "any action is always a trans-action, and any act is really but an initiative that gives birth to a cascade of legitimate and bastard progeny" (2010, p. 101). Plainly understood, problems are effects of the phenomenon of conjoint action, and a public is a set of material bodies affected by a common problem. Additionally, there is no action that is not conjoint action – actions are always transactions, enmeshed in webs of connections. Members of the public are induced, or drawn in, rather than volunteering or participating by strict, autonomous intention (2010, p. 101).

Bennett's vibrant materialist position is in part based on Actor-Network theory, as exemplified in her use of Bruno Latour's concept of actant. As she describes it, the concept of an actant is integral to constituting a non-anthropocentric conceptualization of politics, and to prying "some space between the idea of action and the idea of human intentionality" (2010, p. 103). In a rejection of nature and culture, Latour favours "collective", an ecology of human and non-human elements. For Latour, political action is framed as a call and response between "propositions" – tendencies of actants to move in directions, analogously carrying their momentum or through their choice actions (such Darwin's worms). Responses to problems, for Latour are less the result of deliberation, and more of the accumulation of propositions and movements of actants affected. Finally, Latour also distributes agentic capacity to the event

itself: “policy directions and political moods are irreducible to the sum of the propositions of even an ontologically plural public, for there is always a slight surprise of action” (2010, pp. 103-104). Concerning vital materialism as it distances itself from being an ANT-clone, Bennett recommends that one of the ways to fight the anthropocentrism of traditional politics of ANT is to follow anthropomorphisms of human actants, which blur the lines of subject and object by giving those objects the human characteristics we find in them as descriptors of the relationship between actants and their affective capacity on human bodies and psyches (Bennett, 2010, p. 120).

A public, in summary, is an assemblage or cluster of bodies, harmed by the actions of themselves or others as they transact across connections, the affected bodies draw near each other and try to engage in new acts which will restore or return their power, protect against future harm or effect. Each action in the network then becomes a new conjoint activity with its own chain of indirect consequences. This kind of political pragmatism emphasizes consequences over intentions, relegating responsibility to the task of responding to harms rather than identifying blame (2010, pp. 101-102).

It is the concept of publics which inevitably leads Bennett to a conclusion of political analysis akin to a political ecology

> If human culture is inextricably enmeshed with vibrant, nonhuman agencies, and if human intentionality can be agentic only if accompanied by a vast entourage of nonhumans, then it seems that the appropriate unit of analysis for democratic theory is neither the individual human nor an exclusively human collective but the (ontologically heterogeneous) ‘public’ coalescing around a problem (2010, p. 108).

A pragmatic approach to political problem solving then (i.e. to the resolution of harms) is one that explores how non-human agents (worms, aluminum, food, etc.) not only contribute to a problem, but also to ask how they might contribute to its solution. This pragmatic approach

stems from thinking about publics as kinds of assemblages, which provides the basis for a theory of action which more explicitly accepts nonhuman bodies as members of publics.

In a separate stream, derived from Rancière, Bennett posits two other features of vibrant materialism. The first is from Rancière's concept of *demos*, not as a formed thing or fixed entity, but an "unruly activity" created in conjoint activity and action, which is neither the sum of the population involved, nor the result of the inner disfavoured element. *Demos*, rather, is a kind of "excess" irreducible to the particular bodies involved (2010, p. 106). The second feature comes from a conceptualization of what counts as political from the perspective of effect; as Bennett writes, "a political act not only disrupts, it disrupts in such a way as to change radically what people can "see": it repartitions the sensible" (2010, p. 106). For Bennett, non-human materials have such a power, "to startle and provoke a gestalt shift in perception" (2010, pp. 106-107).

The political goal of Bennett's vital materialism is not the perfect equality of actants, of putting the harms of non-humans on equal footing with those of humans, but a political circumstance with more channels of communication between constituent human and nonhuman members (2010, p. 103). Bennett's vital materialism asks, "what if we loosened the tie between participation and human language use, encountering the world as a swarm of vibrant materials entering and leaving agentic assemblages?" (2010, p. 107). In doing so, we might entertain a set of crazy and not-so-crazy questions. Bennett's examples include: did the typical American diet play any role in engendering the widespread susceptibility to the propaganda leading up to the invasion of Iraq? Do sand storms make a difference to the spread of so-called sectarian violence? Does mercury help enact autism? In what ways does the effect on sensibility of a video game exceed the intentions of its designers and users? Can a hurricane bring down a president? Can HIV mobilize homophobia or an evangelical revival? (2010, pp. 107-108).

The combination of Bennett's "public" with Dant's notion of the driver-car creates increasing complexity for distinguishing the character of the actants within a given network, but also speaks to the affective capacity, the vibrancy, of materials in conjunction with other actants. We may construe the network of actants engaged with the Volkswagen scandal as members of a public, which enter and exit the assemblage just as a driver enters and exits his or her vehicle to form the social unit of the driver-car. The regulations, the mass-produced vehicle chassis, the software, the turbo-charged diesel engines, the myths and legacy of diesel in North American markets, the corporate executives, the characters of old ladies who emphatically advertise the EA 189's identity, come together to produce diesel's success in the market.

Similarly, we may argue that the driver-car exemplifies both *demos* and politicality. Again, we must be conscious of how specific material assemblages produce these results. Exemplary of this specificity and nuance of affective materiality, and conducive to Bennett's claim for following human anthropocentrisms, is a study conducted by Sarah Redshaw concerning Australian drivers.

Redshaw cites a study she conducted in 2006, in which focus group participants were asked whether they associated particular kinds of people with particular kinds of cars and whether they drove differently in different cars. The findings revealed, that, though many denied that the type of car would influence who they were as a person, many participants claimed it could affect how they drove.

Citing one respondent: "If I get in my dad's car, which is a commodore, because it's an automatic, I do drive differently but I don't drive recklessly. It does have the power to go faster, so you tend to take advantage of that" (2008, 42).

Similar respondents had similar comments: nice cars make me feel "more confident", incentive to "try something", "go faster". According to respondents, women sometimes referred derogatorily to "young guy cars which are the 'look at me' type things" (2008, p. 44). Family cars were reported to make their drivers feel more 'adult', while contrastingly, little cars make them feel more like a teenager.

3.3.3 The Issue of Blame

In her second chapter, Bennett attempts to define a theory of distributive agency which horizontalizes the playing field of actants. Bennett describes it as something which illustrates nonhuman things as less social constructions and more actors, and vice-versa with humans themselves as they become less autonomous beings with will and intentionality and more vital materialities (2010, p. 20). Specifically, this theorization has the intention of reconceiving of what moral responsibility and political accountability means for human actants within these ecological assemblages.

Bennett suggests that there is not so much "a doer (agent)" behind things like the blackout, as a doing, an effecting by a "humannonhuman assemblage" (2010, p. 28). The collection, she argues, allows only for a loose fitting of moral responsibility, and to which blame and responsibility don't quite stick. Drawing on both Augustine and Kant for philosophical interpretations of will and agency as being bound up in moral law but inevitably divided against itself (2010, p. 29). As Bennett quotes Brumfield, "all agree that agency refers to the intentional choices made by men and women as they take action to realize their goals," even though "these actors are socially constituted beings embedded in sociocultural and ecological surroundings that both define their goals and constrain their actions" (Brumfield in Bennett, 2010, p. 29). Instead,

Bennett argues, any assemblage owes its agentic capacity to the vitality of the materiality which constitutes it.

What then are the ramifications and implications of this kind of approach to material studies, and in Bennett's case specifically, political issues? Bennett asserts that the electrical grid, in its catastrophic shut-down, told us something; it communicated about the law-abidingness of New York City residents living in the dark, about the shabby condition of the public utilities infrastructure, the disproportionate and accelerating consumption of energy by North Americans, and the element of unpredictability which always accompanies assemblages composed of vibrant and vital materialities (2010, p. 36).

But what of the charge of responsibility to those human actors, the ones who siphon from the electricity grid illegitimately by human moral standards, which Bennett argues should be treated with equal consideration to the branch which strikes the power line in the wind, or the active and reactive currents which flow through the wires? She says: "though it is unlikely that the energy traders shared my vital materialism, I, too, find it hard to assign the strongest or most punitive version of moral responsibility to them" (2010, p. 36). Though she finds it difficult to assign punitive blame, it may be harder for her readers to stomach the thought of energy traders just as swerving materials driven by their place in larger networks of similarly material bodies. Likewise it may be even harder for them to stomach the lack of moral finger-pointing when the repercussions of those material bodies is the trafficking of human beings, reprehensible violence, or illegal organ harvesting (Scarpa, 2008).

To be fair to her point, Bennett does acknowledge that vital materialism is not amoral, it merely assigns the "blame" to a more comprehensive list of actants, in hopes of determining the manifestations of things in motion, and by what sources, connections or relationships they find

the momentum for that direction of activity. As Bennett says, perhaps the ethical responsibility of an individual human should reside "in one's response to the assemblages in which one finds oneself participating" (2010, p. 37): can one attempt to extricate oneself from assemblages whose trajectory is likely to do harm? She would argue that only a sensitivity to assemblages would provide one with the capacity, through new social constitution, to perform these human activities in new directions. After addressing the Marxist elements of this emergent network, I revisit the issue of blame.

3.4 Political Economy: Class, State and Civil Society

3.4.1 Class and class structure

Though a conceptualization of class and class struggle is present in the work of Marx from as far back as the 1844 manuscripts, the most salient reference to class structures and its relationship to Marx's historical dialectic is from the *Manifesto* (1988): "The history of all hitherto existing societies is the history of class struggles" (1988, pp. 55-56). From this departure onwards, Marx's writings in the *Manifesto* coincide with his earlier work on pre-capitalist economic formations regarding the "stages" of economic complexity, embodied within the patrician and slave, lord and serf, capitalist and wage labourer class relations, structured in hierarchy explicitly in relation to each class' position with regard to the economic privileges of any given society.

According to Marx's materialist conception of history, these classes are continuously in conflict based on the concentration of economic privileges. The transition then, to another economic stage, happens when a given population is transformed into a class when the prevailing economic conditions of existence force people into a relatively homogenous group. As an example, we can see this in Marx's exposition on the French in the Eighteenth Brumaire: "In so

far as millions of families live under economic conditions of existence which divide their mode of life, their interests and their culture from those of other classes, and put them into hostile contrast with the latter, they form a class" ([1852] 1977, p. 84).

Notably, the Eighteenth Brumaire also highlights the possibility of intra- as well as inter-class conflict. For example among the bourgeois, Marx discusses the orientations of the political parties in terms of either landed property, wage-labour, or capital. Marx also states that the material interests of the bourgeoisie are the most "intimately imbricated" with the maintenance of the state machine. Its political interest then, was to increase the repression of others in order to maintain resources and personnel of state power ([1852] 1977, pp. 20-25, 35).

The conclusions of Marx's material analysis of class caused Marx to argue that the process of collective realization of class interests, through common position with respect to the mode of production and economic privilege, and with respect to the conflict created by this position with that of the dominant class, would eventually lead to a realization of class consciousness and a mobilization of struggle and conflict by the under-class in opposition to the dominant class.

3.4.2 State and Civil Society

Marx's political perspectives emerge clearly in his writings *The Eighteenth Brumaire* (1851) and *The Civil War in France* (1871), focusing respectively on the 1848 French rebellion and the rise of Louis Bonaparte, and the development of the French political state. Consistent in these, and sporadically throughout his other writings, Marx's views on the state seem to demonstrate four consistent fundamental principles.

Ken Morrison, provides some clarity on Marx's often times ambiguous position with regard to the state. He describes four principles consistent in Marx's political commentary: 1) the

assertion that the state is material in origin and dependent on the economic structure of society; 2) the modern state develops only under certain historical conditions within the circumstances of the productive forces of society; 3) the state reflects the prevailing class structure and is therefore an instrument of the ruling class; and 4) the appearance of the state, throughout history, is dependent on 'civil society' (Morrison, 2006, p. 128).

Concerning the first point, Marx makes clear in his preface to *A Contribution to the Critique of Political Economy* (1859), that productive relations constitute the material foundations of the state. Such material conditions, "constitute the economic structure of society, which is the real foundation on top of which arises a legal and political superstructure" (Marx K., 1859, p. 2). For Marx, the superstructure of legal and political institutions propels individuals to produce, to meet the material conditions required for their continued existence. In keeping with this line of thought, the state (as a historical entity) positions itself on the side of the economy and acts as an institution which provides legal and political protection for existing regimes of production and proprietorship, in order to maintain the productive capacities of its society. As such, for Marx (and any historical materialist perspective) the state always reflects the prevailing class interests and never acts independently of them.

Of Marx's works, *The Eighteenth Brumaire* is central to exploring the idea that Marx held regarding the historical formation of the state. In the *Brumaire*, Marx recounts the story of the formation of the French political state, which Marx believes had been illustrated by a number of features, specifically, the dissolution of French feudalism, and the emerging class interests which developed during the emergence of the industrial mode of production. Marx points to the three key periods in the development of the French state within the rebellions of 1789 and 1851 in France during a period in which unprecedented industrial production provided prosperity for a

small segment of the French commercial class but even greater poverty and distress for those whose role in the production of goods was mainly manual labour. Low wages, poor working conditions and unemployment led the newly created French working class to widespread rebellion in critique of the emergent capitalistic mode of production. In the *Brumaire*, the three periods described by Marx were as follows.

The first period (the February period), is described as the prologue to the revolution by the workers. In this first period, Marx describes the open rebellion of the workers against the National Guard, breaking barricades and resistance points, through which many believed the proletariat had secured a victory against the French monarchy and commercial ruling class ([1852] 1977, p. 153). As Marx remarks, while the Paris proletariat was basking in the "prospect of the wide perspectives which had opened before it", the exiled social class found new support in the peasants and the sub-dominant commercial classes, who subsequently rushed the political stage after the barriers of the previous monarchy collapsed ([1852] 1977, p. 153).

In the second period, which Marx calls the period of the foundation of the bourgeois republic, the commercial classes acted to impede the advances of the workers by parliamentary devices: "The National Assembly which met on 4th May 1848 had emerged from elections held throughout the nation; it therefore represented the nation. It was a living protest against the pretensions of the February days and an attempt to reduce the results of the revolution to the standards of the bourgeoisie" (Marx, [1852] 1977). The goal of the assembly, as Marx writes, had no other result than to remove the leaders of the proletariat revolution in the first period, and displace them from the public stage for the duration of the formation of the French state.

Marx notes that in this second period, the remaining factions were comprised of the Montagne faction (established by the petit bourgeoisie) made mostly of social-democrats; the

party of Order, which was comprised of the Orleanists (loyal to Louis Phillip); and, the Legitimists (loyal to the Bourbons), were organized on the basis of their material interests. During this second period, the two constituent elements of the party of Order were unified.

> Under the Bourbons, big landed property had ruled, with its priests and lackeys; under the July monarchy, it had been high finance, large-scale industry, large-scale trade, i.e. capital, with its retinue of advocates, professors and fine speechmakers. The legitimate monarchy [Orleanists] was simply the political expression of the immemorial domination of the lords of the soil, just as the July monarchy was only the political expression of the usurped rule of the bourgeois parvenus. It was therefore not so-called principles which kept these factions divided, but rather their material conditions of existence, two distinct sorts of property; it was the old opposition between town and country, the old rivalry between capital and landed property ([1852] 1977, p. 173).

In the final period, headed by Louis Bonaparte, the formation of the constitutional republic of France supplanted the commercial classes as rulers in the name of the people. The result of which was the suppression of the workers' original demands by what Marx called emerging "wider interest" ([1852] 1977, p. 156).

> The Legitimist and July monarchies only added a greater division of labour, which grew in proportion to the creation of new interest groups, and therefore new material for state administration, by the division of labour within bourgeois society. Every common interest was immediately detached from society, opposed to it as a higher power, general interest, torn away from the self-activity of the individual members of society and made a subject for government activity, whether it was a bridge, a schoolhouse, the communal property of a village community, or the railways, the national wealth and the national university of France. Finally, the parliamentary republic was compelled in its struggle against the revolution to strengthen by means of repressive measures and centralization of governmental power. All political upheavals perfected this machine instead of smashing it ([1852] 1977, pp. 237-238).

Marx's civil society was a marked departure from Hegel, who argued that civil society and the state were separate fields: civil society is associated with self-interested individuals, while the state overcomes the actions of self-interested actors, mediating between them and the public obligation of the citizen to uphold the common good (Hegel, [1820] 1952, pp. 129-130). Marx held, rather, that the state was complicit in splitting the political and civil realms of society

in its active defense of private property: in its defense of private property, the state is instrumental in facilitating the consolidation of ownership of the means of production by one class within society, and enabling what Marx called the ruling classes to act through state coercion and power (2006, p. 136). Though Marx borrowed the term 'civil society' from Hegel, he argued that since the state defends private property, it can never rise above its so-called 'self-interest'.

For Marx, civil society emerged only in the transition to capitalism, and the institutionalization of the capitalist economy with its subsequent effects on political structure. During the feudal period and prior, society was inevitably political and lacked any formal separation between the civil and political realms of society – all aspects of property, occupation, and family existed in the feudal period in the forms of lordship, caste and guild (Marx, [1843] 1978, pp. 42-44). Marx believed that the emergence of civil society broke down the individual's relationship to wider society by fragmenting the political and the civil – terminally, modern civil society sets individuals into conflict with one another in so far as it encourages individuals to pursue private interests, and so far as the state confers on them common political rights. In doing so, it appears to be cooperative, when in reality it is coercive ([1843] 1978, p. 36).

3.5 Contemporary Political Economy of Automobility

In contemporary analyses of political economy, the automobile has an integral place in the realization of Marx's conception of the relationship between state and civil society. The idea of a dromocracy is integral to a description of contemporary society in the context of the modern political economy – it means "ruled by movement and acceleration" (Paterson, 2007, pp. 5, 8). In Matthew Paterson's approach to political economy, cultural politics and environmental politics are defined by movements, all of which are ecologically significant, some of which are habitual,

but nevertheless always entwined within global processes: "as a means to access consumption items produced and distributed transnationally; as consumption items (cars) with a high degree of transnational production and global symbolism; and as a potential for national integration into a global economy (transport infrastructure)" (2007, p. 7).

This 'movement', in abstraction, according to Paterson, is simultaneously three things: the necessary conditions of the reproduction of globalising capitalism; the celebrated terms of the consumers which are symbolically connected to ideological principles such as progress, autonomy, freedom, etc., and; they accelerate the "twin crises" of ecological degradation and global injustice (2007, p. 7). A recent edited volume by Walks echoes this sentiment, arguing that the contemporary political economy is dominated by the 'mobile system' created by automobility, emphasizing the core ideals of liberalism: "freedom, autonomy, individualism, self-reliance, self-responsibility, and unfettered mobility" (2015b, p 205).

Within this overarching principle through which the contemporary political economy is addressed, Paterson makes a point to address automobiles, particularly from the perspective of the rise of the automobile, which he explains in terms of "…the intertwining of the particular developments of capitalism in the 20th century [and] the production of particular types of individuals attuned to constant mobility" (2007, p. 91). In doing so he argues for a "more adequate account of why cars have become so dominant" (2007, p. 92).

With respect to the former perspective, Paterson describes the rise of the automobile in terms of its relationship to economic growth and in terms of the relationship between economic growth and the state. Paterson argues that the growth of automobiles is the result of the decisions that states have made with respect to favouring the car over other forms of transportation. This is particularly due to the nature of the car as a commodity which accelerates economic growth

more intensively than other modes of transportation. Paterson describes this capacity of the car in terms of three major characteristics: 1) it stimulates technical innovation by driving improvements in mechanization/assembly, intensified division of labour, and other general measures of efficiency related to production (2007, pp. 93-94); 2) it offers flexible mobility, offering people the opportunity to move around further and more conveniently, both for productive (work or delivery of goods and services) as well as consumption (increasing the number of places a consumer has access to, as well as making tourism more affordable) (2007, p. 96); and 3) it stimulates the economy by drawing on extensive networks of linkages both backwards (drawing upon natural resources production, refinement, and manufacture) and forwards (gas stations, motels, insurance, advertising, construction, etc.) as well as the supply chains relevant to those linkages (2007, pp. 96-97). This relationship, between automobile industries and economic growth more generally, is echoed in similar political economic approaches to understanding the role of the automobile in contemporary society (Walks, 2015; Wells, 2012; Urry, 2010; Behrends, 2011; Dennis, 2009).

This connection between the car industry and economic growth is strong, and simultaneously there has historically been concern by governments to support the growth of domestic production facilities in order to secure employment, investment, and economic performance (2007, p. 100). Within a Marxist context, this relationship is dependent on the state as an entity which is structurally and inevitably compelled to promote capital accumulation within a capitalist context, and therefore promotes and protects those industries through which that accumulation is made possible. In this case, as Paterson argues, road building was the principle element of that relationship (which linked to military access of regions), although neglect of alternative means of transport, as well as subsidies to the car relative to competitors

were also integral components which ensured the success of automobiles over alternatives (2007, pp. 116-118). Effectively, the relationship between state and automobiles worked to support the dual purpose of reproducing capitalist society and state legitimacy.

In the context of Volkswagen, the relationship between state and automobile industry is clear – a lack of oversight and generally lenient sanctions against breaches of public health and public trust. Additionally, there is a tension of "wider interest" which emerges both in regulating automobile manufacturers and installing regulations which reduce emissions-related pollutants. Paterson's approach to the automobile economy does well to establish the general quality of the automobile as something which produces (and effectively is produced by) a dromocratic society. So too does it work well to establish a concrete example of Marx's theoretical paradigm of the state's relationship to civil society. With that said, Paterson's treatment of the automobile is in abstraction – the "car", as it were. The car, however, does not appear uniform in society (or cultures); its constitution is both culturally nuanced and physically determined.

3.6 Conclusions

In light of this chapter's content, there are several conclusions to draw which implicate materiality as necessary for completely understanding the dynamics of abstracted Marxist concepts. For example, we can observe how CAFÉ and LDV rules forced VW to develop a US-compliant vehicle, which in tandem with physical limitations created by the industrial capitalist mode of production (the physical limitations of Volkswagen chassis and model development cycles) create a contradiction between the interest groups of society. Selective catalytic reduction technologies are incompatible with existing models, which are too limited, physically, to implement the available and appropriate technological solution.

External to the diesel scandal, we may reap some benefit of the theoretical juxtaposition of Marx's social classes and Bennett's 'publics'. Marx is at times ambiguous about where responsibility lies for the harms and injustices of one social class against another, but it's clear for Marx there is blame to be found in capitalism itself as a form of social organization, although this appears ambivalent. In this way, Bennett and Marx are compatible: for both, the outcome, the harm, is the product of all constituents of the system in which it appears. For Marx this appears in terms of social classes arranged around productive and consumptive relations. For Bennett, publics coalesce around problems in times, neither consistently bourgeois nor proletariat, their social character determined by the circumstances in which they are drawn into and around.

The Volkswagen scandal provides a unique opportunity to explore how valid Bennett's claim for new materialism is, particularly against prevailing Marxist approaches. While the scandal does well illustrate the applicability of a political economic perspective, where it appears to fall short is in its appreciation for specificity. A more materially-focused approach, à la Bennett, not only emphasizes specificity through its appreciation of the physical manifestation of actants, but expands the range of potential causalities.

In terms of Patterson's and Marx's approach, the state works to maintain and expand the automobile's infrastructure and use because of its economic linkages, thereby supporting the bourgeoisie in active defense of existing relations of production. In the case of Volkswagen, the state has an interest in minimizing the economic damage it levies against the company in terms of financial sanctions despite the grievous breach of federally-mandated production constraints. Corporate executives resign, but receive sizeable severances in compensation. Additionally, the

state must mediate the many special interests which lobby it, in this example that means green-house gasses (GHG), public health, and corporate interest.

The state mediates the desires and intentions of special interest groups: it empowers agencies like the EPA and CARB, and enacts legislation which hinders the progress of its most precious productive industry. When the sides rise into eventual conflict, such as the diesel defeat device implementation, the state satisfies neither interest, but rather secures the maintenance and continuation of the prevailing economic institutions by limiting the severity and efficacy of its financial sanctions.

The next chapter ventures further into this larger network with an emphasis on the consumer and the product. While Dant and Bennett have shown that, some materials combine into new actants – the car is vibrant, and so are its constituent technologies, but the driver-car is also vibrant – a unique social entity which is made in combination of car and driver. There is also a uniqueness to explore in this assemblage, which reinforces concerns for thinking about cars solely in terms of abstract commodities – different kinds of cars pair with different kinds of people, producing different kinds of driver-cars, essentially. Sports cars, family sedans, pickup-trucks and mini-vans all produce a unique material assemblage in themselves, even more so with drivers included. Even more specifically, Volkswagen TDI's pair with eco-conscious drivers, who realize idealized versions of cars and themselves in their coalescence and behaviour.

4 Chapter: The Vibrancy of Matter and the Inseparability of Base and Superstructure

4.1 Introduction

The explanations explored in the previous chapter are integral to the narrative surrounding Volkswagen's decision: CAFE and LDV standards meant that VW faced a fine if its fleet of vehicles couldn't match the regulated miles per gallon and grams of emissions per mile, per pound (or per foot-squared). VW only had its diesel-powered cars to bring this average down because of a European market emphasis in its bottom line. It saw the cost of making its cars U.S. compliant as the cost of making its fleet compliant (because of the way vehicle platforms must be significantly altered to accommodate the technology which would have allowed it to be compliant). Plans to actually implement a diesel technology that would meet those requirements became the catalyst of a corporate power struggle between incoming and existent executives, each with their own solution to offer. Eventually, one party won out, went forth with a fraudulent (but much less expensive) answer to the corporate issues, and resolved (in their eyes) the burdens of regulatory compliance and financial cost. Again, these explanations fall short of entirely explaining why Volkswagen continued with its defeat devices after the cycle of vehicle model development would have facilitated technologies for compliance, and after the Euro 6 regulations would have made the emissions compliance not just localized to the U.S., but to the company's mainstay market of Europe.

This chapter builds on the regulatory, corporate and market constraints but is also inextricable from them (for the purpose of organization, I have extracted it artificially). This last element of the story – consumer values – are essentially connected to the market constraints regarding the competitiveness of the product line in the eyes of the consumer, but with an

emphasis on exploring the consumer-side: of consumer values as products of prevailing automotive culture trends. The result is a more patch-work story translating how consumers view the automobile in general: price and cost of ownership, brand identity (e.g. "green" vehicles, perceived symbolic value of the brand, etc.), driving sensation, fuel economy, and aesthetics. After immersing myself in all manner of information available, the most effective organization for the content follows three objectives.

First, I establish an ethnographic description of "fun to drive", as created by the assemblage of driver, car, and external network of materials and social constructions. It is clear that what Bennett brings to an analysis of Volkswagen diesel is in exploring how the cars themselves contribute the behaviours which defines the assemblage of the scandal. For this reason, my first task in this chapter is to establish that idea thoroughly. Second, I establish the context for consumer trends in the North American automotive industry. Beginning with the end of "Peak Car", I address millennials as the fastest growing consumer demographic of automobiles and the patterns of consumption that define them. From this I move towards establishing the link between this boom of consumption in the automobile industry and the boom in the sale of clean diesel cars. Third, I explore the automotive press response to the "clean diesel" vehicle lineup – which serves as a proxy for the public expression of where these clean diesel vehicles landed in terms of the general culture of automobility. Press coverage includes reviews by popular automotive culture magazines of the 2009 and 2013 Volkswagen TDI Jetta, press coverage of vehicle awards, and industry comparisons between "efficient" automobiles (i.e. electric, hybrid electric-gasoline, and clean diesel).

In this context of content, I explore other scholars of anthropology of material culture, namely Daniel Miller, in order to examine Bennett's concept of material vibrancy more

thoroughly. In conclusion, I find that, consistent with some criticisms of Bennett's perspective, some materials are more vibrant than others; that social constructs, values tied to aesthetics and the social framing of objects (e.g. aggressiveness, gender, power, and speed) should not be ignored in the pursuit of determining and exploring material vibrancy.

In positioning the whole story as to have a foot in both camps (the vibrant/new materialist and the political economic/old materialist), the Volkswagen diesel scandal exemplifies how specific cars (and social constructions of cars) create particular driving behaviours and particular ideas about what constitutes a car, are produced by these assemblages. Exemplary of this is the way diesels surpassed consumer expectations because of the *way* they were driven, likewise so too was it the reason that hybrids disappointed. Car manufacturers measure mpg and emissions based on an imagined driver, characterized by conscientiousness and conservative habits.

Real drivers, however, aren't generally like those imagined by emissions regulators. They enjoy the thrill of acceleration and of speed in driving, which is produced in their interactions with their vehicles (and dependent on the kind of vehicle involved). This is a prominent point featured in the journalism discussed in this chapter. The ideologies, which are discussed by Marx and Paterson, expose how blame-worthy subjectivities are not only created in the abstract and general qualities and capabilities of the car (i.e. its position relative to the economic structure of society and the consumers/producers within it, nor its apparent provision of freedom from regimented train systems, or its role in battlefield domination), but the phenomenological and symbolic character which they generate that is peculiar and particular to the material assemblages, both physical and ideal, in which they are constituted.

4.2 "Fun to Drive"

At this point, it is clear that the issue of "fun to drive" is integral to a discussion of Bennet and the Volkswagen scandal. Fun to drive is produced in the assemblage, the driver-car, it reflects the co-production of identities and behaviours of drivers through the combination of cars and drivers together, and in the context of that actant's wider network of materials.

The observations and rhetoric which exemplify the phenomenon of fun to drive are discussed at length in the reviews of Volkswagen's TDI vehicles in chapter four but the values and meanings which underscore those observations are explored more thoroughly here. For this I draw on multiple sources including the reviews, Dant's driver-car, and my own experiences.

"Fun to drive" is an important characteristic in automobile consumption, but nonetheless subjectively produced between driver and automobile. For this reason, Bennett's materialist perspective is integral to a discussion of the diesel scandal. Loosely defined, fun to drive is a combination of noise, handling response, body control and quality of power delivery present in a driving experience. It was this quality which Volkswagen was able to leverage against mass consumption, through its deception, and produce a competitive product.

Noise is often a component of a fun to drive car. This idea is exemplified by the ways that consumers often alter exhaust flows to produce more aesthetically pleasing sounds, and in the way that the success of performance-oriented vehicles feature devices to increase the aesthetic qualities of their engine noises. As mentioned in the introduction of this work, in 2013, two leading automotive journalism sources revealed the methods through which manufacturers artificially enhance or create engine noises to appease drivers (in notable models such as the Lexus LFA, the Mustang GT, the Volkswagen GTI, BMWs including the M5, and several new Porsches). The process of enhancing the sound of the engine involved either programming a type

of engine note 'soundtrack' into the cabin's speakers during periods of acceleration or mechanically amplifying the engine's noise and plugging it, via a resonator pipe, into the passenger cabin (George, 2014; Car and Driver, April 2012). The act of intentionally focusing on, and augmenting, the noise made by the engine was in effect an attempt to maintain the acoustic sensation which was present in large displacement cars (i.e. historically, performance-oriented vehicles), which existed as a signifier of performance autos and their brands. In this capacity, noise functions as the social symbol of what a performance car meant and all of the experiences that accompanied it.

Handling and body control of a vehicle is another quality which defines the fun to drive genre of vehicle. Handling or vehicle feel is intrinsically linked to Dant's work on the driver-car: firstly that driving is considered to be beyond conscious cognitive capacity alone, and; secondly, the idea that the car itself suggests an embodied relationship with the driver. According to Dant and Gibson, the vehicle itself yields a variety of perceptual cues and which affords specific actions or perceptions. The 'feel' of the car or the 'behavior' of the car are terms which indicate what is meant by this particular field of visual, tactual, auditory, and kinaesthetic experiences (2004, p. 64). According to some work on driver's assessments of vehicle performance, the subjective human judgement of handling is based on the predictability and rapidity of vehicle response to inputs, stability of damping yaw rates, immunity to environmental interference (cross-winds, etc.), and reduction in overall body roll (Pauwellusson, 1999). Similarly, in a review of the 2009 Volkswagen Jetta TDI, a car purportedly "fun to drive", the Jetta was complemented on "appropriately weighted steering, reassuring suspension compliance (even with the TDI's rear torsion beam), sharp chassis reflexes, and the overall sensation of dynamic eagerness imbued into the Jetta DNA" (Kong, 2013).

Quality of power delivery is the third and final element which generally constitutes the fun to drive characteristic of a vehicle. Reviews of Volkswagen's TDI vehicles exemplifies the role of power delivery in producing a car that bears the fun to drive moniker. In most cases, the vehicle's praised element was its turbo-charged diesel engine. Diesel engines have a natural propensity for producing higher numbers of torque than similar displacement gasoline engines, which translates into more spirited acceleration (Tate, 2009; Blanco, 2008).

The ambiguity of the title can sometimes be employed as a mechanism to reaffirm one's own identity with respect to vehicles. The trait of being fun to drive is often juxtaposed against miles per gallon in a way which positions car manufacturers as companies which need to cater to consumers (fun to drive) and government regulations (emissions, miles per gallon). Despite the fact that consumers are attracted to cars with high miles per gallon figures, the consumers themselves as drivers are often not the ones whose behaviours and attitudes those figures are based on (O'Dell, 2015). This loosely applied dichotomy sometimes becomes a feature through which car consumers produce a sense of membership – commuters are believed to be more occupied with fuel economy and technological creature comforts than those who consider themselves "drivers".

The fun to drive quality, is manifest in behaviours of drivers, co-produced by the cars and is opposed to the principles of economic driving on which the Volkswagen diesel's fuel and emissions ratings are promoted. For this reason, there is a contradiction between how cars are measured and how they are used by consumers outside manufacturer measurement (Tracy, 2015). This resonates particularly in the context of a comparative review of the Jetta TDI and the Honda Civic Hybrid (both from 2009). The Civic Hybrid placed fourth (out of four vehicles compared) due to an "ineffectual powertrain" and startlingly low fuel economy under spirited

driving. The Civic's betrayal of its advertised manufacturer fuel economy rating forced the reviewers into making the claim that only with the right driver would 44 mpg might be a reality. They suspect that "there are far more "wrong" drivers out there" who would be disappointed with the real-world numbers in their fuel economy (Kong, 2013).

What is integral to this discussion of fun to drive and Bennett, is the production of the fun to drive characteristic by both the car and the driver – not simply the driver's nor the car's attributes alone effectively produce the contradiction or the behaviours. But, the interaction between car and driver, and the production of the social entity of the driver-car does not take place in a vacuum – this is the importance of taking into consideration social constructions and ideologies in the production of the driver-car's social actions.

In the interest of explaining the role of social constructions on the behaviours of the driver-car, we can turn again to Redshaw's work regarding automobile makes and models and ideological (and phenomenological) examples explained by her participants. As discussed in chapter three, Redshaw conducted a study in 2006 in which focus group participants were asked whether they associated particular kinds of people with particular kinds of cars and whether they drove differently in different cars. The findings revealed that though many denied that the type of car would influence who they were as a person, many participants claimed it could affect how they drove.

Redshaw's work deals primarily with performance cars, through which she explores social framing – the capacity of certain kinds of cars to both create and be created by, the social contexts in which they exist:

> Articulation applies to cars in the sense that cars are seen as expressive and used in expressive ways to convey particular meanings. It is not just the ways cars are spoken about but also the meanings that the appearance or 'look' of the car is

> intended to convey through the way it is built into cars as well as how it is framed and promoted (2008, p. 36).

According to Redshaw, cars are assemblages, parts that make up a coherent whole, which are both capable of action as well as 'saying something' meaningful – articulating symbolic meaning. Similarly, much the same as body language, cars are articulated in particular ways to express and make possible different actions and emotions.

Expressions exemplified in people's experiences of cars and styles of driving are varied, and often connected with particular cars. Redshaw focuses on the relationship between "enthusiasts" and performance vehicles (the Australian Holden SS, Falcon XR6) and the 'hooning' aspect of driving behaviour, characterized as reckless, aggressive, erratic - the experience of pushing the limits on the road and it's contrasted with the commuter, who values convenience and comfort, privacy. Driving, in this sense, is often associated with thrill and excitement, especially when it comes to the flash and speed of cars. Emphasis in this style of behaviour is placed on sensations stemming from perceived free-flowing movement. There is a distinct connection between the act of passing cars on the road and a perceived sense of pleasure, and of domination of others and one's environment (2008, p. 39). Redshaw argues that these sensations are not far below the surface of the ways cars are popularly represented both in positioning the car in proximity to existing symbols (cars pictured as being the equivalent of their racing counterparts) and through design as an appeal to existing symbols (that certain aesthetics emphasize social characteristics and a human attitude).

The aggressive characteristics associated with race and rally cars, designed for intense competition, are intended to look the part. Redshaw's cited example shows an ad for a car (a Toyota Corolla), which features the car divided down the middle: on the left-hand a rally-version of the car, complete with race-track backgrounded and race car driver foregrounded, wearing

protective coveralls. On the right side, a factory production version of the vehicle, situated on a background of suburban streets. The ad emphasizes both race and road vehicle, and the symbolic associations of racing (competition, domination, speed, and excitement) are seemingly transferred to the road car, as if both cars were one in the same (2008, p. 40)

The social framing of cars in these capacities emphasizes specific affordances (performance and power) through signifying association with the driving styles of racing and rallying, despite the fact that these models are completely inappropriate for road driving. "The car is promoted as the means and emblem of individual expression and performance. Power and speed and standard features. …More power, better performance, faster acceleration are constantly being generated and promoted to make the car and its driver stand out" (2008, p. 40).

To highlight the second perspective, Redshaw explores the Mercedes C-Class. That particular car model is:

> … Described by the design team as having taillights shaped to make the car seem wider than it is, giving the impression that it is 'elbowing someone out of the way'. Mercedes are attempting to appeal to a younger buyer and apparently these 'young fast-paced sharpies'…want a car that can dart in and out of traffic. Previous C-Class sedans have had a more sedate feel. The new one is tuned for faster steering responses and more agile dynamics (2008, p. 41).

This excerpt exemplifies that articulations of cars as design objects have social values built into their very construction. These social values are found in both their aesthetics and mechanical affordances, highlighting the specific characteristics of the kinds of peoples (i.e. kinds of drivers) they want to put in the front seat.

In Redshaw's argument, there is a lack of recognition of the car's destructive potential tied to the narratives implicated in much of car advertising - giving priority to cars over many other aspects of the social environment demonstrated through aggressive "pushing through" which cars are presented with. As Redshaw writes, "the ability of the car to go faster appears to overrule the

cost and appropriateness of faster speed. It is then addressed as a tool for saving time at all costs, and for getting ahead and the extent of the symbolic significance is hidden" (2008, p. 40).

4.3 The Climate of Consumer Automobile Sales

4.3.1 "Peak Car"

Automobiles have had a staggering social and economic impact since their mass production at the advent of the 20th century. There were 1.2 billion vehicles on the road in 2014, making personal transportation via car not an insignificant fact of many people's lives around the world (Voelckler, 2014). By any and all definitions, cars are not an insignificant fact of North American, or global social life. Recently, however, there is an uncertain future for the realm of automotive consumerism, with environmental and economic values taking an unsure hold in the ethos of the automobile industries' future client base. The "Peak Car" hypothesis still taunts one of the largest international industries.

It was argued that "Peak Car" happened in 2008 and its cause was the unforeseen cessation of car buying among millennials (individuals born after 1980). In 2011, the average American was driving 6% fewer miles per year than in 2004 (Welch, 2015) and driving, the believed-to-be quintessential US mode of transit, had not increased in half a decade, even though the economy and population had continued to grow - the longest slump in vehicle usage since the OPEC crisis of the late 1970s. In 2012 and 2013, people in North-America, particularly of the ages between 16-35 (millennials), were driving less than they did in 2008, and far less than they did in 1983 (Tuttle, 2012). Nearly two-thirds of American millennials were living in cities, and while highways and urban centers were increasingly congested with traffic, the penetration of internet-accessing smartphone technology has facilitated the dissemination of live-coverage public transportation information, expanded the realm of vehicle-sharing and taxi services like

Uber and Lyft, and provided welcome e-commerce solutions replacing trips to shopping malls. In 2013, a study by General Motors showed that the consumer interest in car ownership was well below historical levels, except among ages 55+ (Welch, 2015). One automotive journalist was already arguing that the change towards a postmodern, post-automotive generation was going to have profound implications: for how the federal government spends transportation dollars, for how auto and oil companies make money, and for future patterns of real-estate development (Ball, 2014). But peak car was not limited to the United States.

In 2011, an article in the *Huffington Post* approached the issue of growth in car production and consumption: despite numerous costs for raw materials including oil, increasing emission of pollutants, and physical space requirements, the number of cars on the road totaled over 1 billion, with projections to surpass 2.5 billion by 2020 (Tencer, 2011). Additionally, increasingly, cars occupy the number one position for production of harmful emissions: in the same year (2011) in Canada, passenger cars, trucks and motorcycles released a combined 88 million tons of CO2 emissions. Combined with freight transport, transportation emissions generated a combined total 170 million tons of CO2 emissions – just 8 million tons more than all domestic oil and gas production (including extraction and refining) (Environment Canada, 2013). Environmentally and ecologically speaking, maybe peak car was a positive thing, correlating with millennial attitudes towards environmental consciousness and sustainable futures (Timm, 2014; Pew Research Center, 2011).

In 2013 there was an explosion of scholarship concerning the decline of automobility in a number of industrialized countries. For example, Kuhnimhof, Zumkeller, and Chlond explored the trend in France, Germany, Great Britain, Japan, Norway, and the United States, where car travel was characterized long-term growth and sudden signs of stagnation or even decrease in

vehicle use since the mid-2000s. Attributed to an aging out of the regular driving populations, and a decline of travel demands and car ownership by young adults, Kuhnimhof presented an affirmation of the "peak car" hypothesis (Kuhnimhof, 2013). Findings confirming the decline of car use per capita in many of the economies within the so-called first-world were echoed in a numerous studies between 2012 and 2015 (Gargett, 2012; Goodwin, 2012; Goodwin & Van Dender, 2013; Headicar, 2013; Kuhnimhof et al., 2012; Le Vine & Jones, 2012; Metz, 2013; Sivak & Schoettle, 2012).

There was a lot of worry that surrounded the decline in overall purchasing and use, especially among millennials. Articles like those in *The Atlantic* speculated as to what would happen if current attempts to breach the market, unlock what was thought to be a dormant potential of millennial buyers, were unsuccessful, seeing historically how cars and automotive industries have been incredibly integral to economic recoveries (Thompson & Weissman, 2012). Three years later, *The Atlantic* presented a starkly contrasting piece of journalism: "Millennial demand for cars is growing quickly. New vehicle sales among young people are rising as if drawn on a ruler" (Thompson, 2015).

4.3.2 Trend Shift

Despite the plethora of academic and commercial writings on the values of Millennials as consumers, there is very little currently written in academic journals about the buying habits of millennials in relation to automobiles beyond the "peak car" hypothesis, i.e. that that activity is in decline - that millennials are no longer interested in buying cars, that miles driven per capita is plummeting, and that in general terms, the age of private automobile ownership is finished. Much of the information available on this trend of renewed buying comes from very recently published automotive and business journalism, typically reporting on the findings of

independent, corporate, marketing and research projects. With the caveat that like most anthropology, what is compiled and written here is at best an interpretation of an interpretation, the following is what we can infer from that available data.

The theme seemed to echo everywhere in North American mass media in the second half of 2015. What was seen as perhaps a significant cultural shift away from automobility, suburban housing, and cliché American middle-classisms in the last five years wasn't actually happening: millennials were accounting for 27% of new vehicle sales in the U.S. in 2014, up from 18% in 2010 (Cao, 2015). Canadian auto sales set a new annual record for the second year in a row, increasing 6.1% from 2014 to 2015 (The Canadian Press, 2015). Bloomberg reported on more than one occasion that, not only are cars being sold more regularly, but the millennial cohort which was seen as trending away from consumer automobiles in general is returning into the fray with an unforeseen "fervor", now quickly becoming the biggest automotive consumers since their boomer grandparents (Welch et al., 2015) the big three auto makers from Detroit (GM, Chrysler, and Ford) as well as a number of large Japanese firms (Honda, Nissan) reported increases in total sales as high as 7.8% from August 2014 to August 2015 in the US. Reasons for the return to growth were touted attributed to "the economic recovery, vehicle affordability and more employment" (Welch, et al., 2015; Ralph & Welch, 2015). With interest rates down, and employment on the rise, it seems now as though what were thought to be mainstream-resistant consumers were simply biding time on a return to the status quo and a strong undertow of automobility values. Arguably, millennials are actually saving the automobile industry, rather than turning their backs on it – but it may not be only for the reason that automobiles are becoming affordable again (Arison, 2015).

The recent death of Toyota's "youth-oriented" vehicle brand Scion has provided some significant insights into the relationship between what millennial consumers want, and how automakers either succeed (or fail) at recognizing that what a car means is not static. Michelle Krebs, senior analyst for *Autotrader*, speaking at the Canadian International Auto Show (CIAS) in Toronto argued that "millennials are more mainstream in their buying than Gen Xers;" "…they want established, highly respected global brands. We call it the mainstreaming of the millennials because they are buying exactly the kinds of vehicles that baby boomers do, really" (Powers, 2016). According to Krebs, it seems the only real difference between the automobile buying habits of Boomers versus Millennials is that Millennials expect full technological integration, particularly with their wireless devices (Powers, 2016). Additionally, purchases of compact SUVs were the biggest driver of growth in the past year, according to Krebs, emphasizing that size and functionality (i.e. utility, as in Sport Utility Vehicle) is important to this generation of automobile consumers (Powers, 2016).

Other studies have shown that Millennials "show the most love for their cars" (Elmer, 2015). According to research firm *Strategic Vision*, a new metric called the Customer Love Index (CLI) was developed to track which segments of the population "loves" vehicles the most along with documenting which vehicles get the most love. Details on methodology have not been available, but the metric has been designed as a marketing tool to attempt at quantifying the level of infatuation that an owner has with his or her vehicle (Elmer, 2015). According to the research group's findings, Millennials, on average, were assigned an average CLI score of 470, compared to the rest of the individuals polled who provided an average score of 400. The index claimed that millennials are inclined to love their small, budget-focused hatchback just as much as a luxury vehicle owner. Additionally (and this is very important) out of all the brands on the index,

Volkswagen garnered the most "love" – before its recent emissions scandal. One peculiar finding of the study was the low scores of hybrid vehicles, which scored even below minivans on the index (Elmer, 2015).

In fact, other studies have made claims that Millennials, while they may still be car lovers and avid consumers, don't actually like electric/hybrid vehicles as much as traditional combustion ones. According to research group *Continental AG*, 84% of respondents between the ages of 16 and 25 believed driving is important. Surprisingly, 76% of those individuals reported driving just about every day (Cole, 2015). The study, which took place in the second half of 2014, included a representative sample of 2,300 drivers in the U.S. and 1,800 in Germany. Additionally, a further qualitative survey of 400 vehicle owners in each of France, Japan, China the U.S. and Germany was conducted (Cole, 2015). The study echoed the opinions of *Autotrader* analyst Krebs, in that technological connectivity is key and ownership of a vehicle is still seen as the desired route for transportation.

Another of the findings in the study by Continental AG resonated with earlier-mentioned research by Strategic Vision: while fully electric vehicles were seen as being environmentally friendly by 71% of Americans surveyed, these cars still ranked poorly in other areas. Only 31% of U.S. respondents reported that Electric Vehicles (EV) were "pleasurable to drive" while just 38% found them aesthetically appealing (Cole, 2015). Also, just 27% of respondents thought EVs were "sporty" (Cole, 2015). Additional findings included that fewer drivers expect to use a fully electric car within the next decade (just 21% of people between 31 and 59 years old thought EVs were a viable transportation solution), a figure that is down 10% compared to a similar study conducted by the group in 2011 (Cole, 2015). Importantly for the Millennial perspective, just 24% of drivers aged 16 to 30 expected to use an EV in the next 10 years (Cole, 2015).

What appears to be the case in these conclusions is that, despite their environmentally-conscious branding, these cars may not be resonating within current vehicle consumers, who are in fact, Millennials. But this information creates some dissonance with what is known about Millennials – arguably that they are the most environmentally oriented consumers.

According to a recent Nielsen Online Global survey over 30,000 respondents globally, we are living in one of the most environmentally, sustainability-oriented ages of consumer behaviours ever. The company argues that, despite the fact that Millennials are coming of age in one of the most difficult economic climates in the past 100 years, they continue to be most willing to pay extra for ostensibly ecologically-sustainable offerings: almost 75% of respondents in the survey, up from approximately half in 2014, reported they would be willing to pay more for sustainable offerings (Nielsen Global, 2015).

Additionally, Millennials have been reported as the generation most invested in health and the environment. According to one publication, millennials are more likely than any other age group to be concerned about serious environmental issues, likely to feel they can make a difference through lifestyle changes that can add up to benefit the environment, highly concerned about the threat of climate change, say that being eco-friendly improves their quality of life, and that actively look for changes they can make in their home and lifestyle to be greener (Glass Packaging Institute, 2014). Other publications reveal that millennials' green intentions don't only apply to shopping, but also where and how they work, and their investment strategies (Morgan Stanley, 2015).

But the reality may be thick with irony: studies have reported that millennials are also the least likely to take actions that would support those beliefs. Millennials are the least likely to sort

recyclables from trash and the least likely to take steps to save energy - reported to be high intent, low action (Glass Packaging Institute, 2014; Head, 2015).

There is of course only so much we can infer from these studies. Though these observations are tentative and contestable, they do provoke considerations for role of materiality in the trends expressed regarding this growing demographic and their vehicles. Is there a role played by the material composition of those cars, or is it simply a matter of changing economic circumstances? In the context of the growth of diesel vehicles around this time, there is an interesting correlation to entertain.

4.3.3 Diesel Automobiles and Volkswagen's "Clean Diesel"

Diesel automobiles seem to fit perfectly into this situation, bridging the gap between the renewed activity in car buying among millennials and the apparent contradiction between their purported ideology of environmental conscientiousness and what emerges in practice. Even if this correlation is entirely the product of stretches of my own imagination, the values of consumers expressed above still arguably presents a basic outlook for the consumer values of the next largest generation of consumers. Additionally, the material network of Volkswagen's diesel cars remains intact and still worthy of this academic inquiry.

As available in mass media, the consumption of diesel-powered automobiles was reported to be exploding at the same time automobile consumption was returning to growth, generally between 2010 and 2015. This is particularly true for North America, where the purchasing of automobiles was declining, but also true among regions of the global south (such as India) which were already in a period of growth in which the purchase of cars was increasing along with expanding middle classes and incomes (Lutz, 2015; J.D. Power, 2015).

In 2014, VW diesels had been known for years as “fun to drive” (Voelckler, 2015). The cars produced much higher torque numbers compared to gasoline engines of similar power, and combined with the prestigious German-engineered suspension tuning and handling. They gave small and mid-sized cars like the diesel Jetta the title of an affordable sports sedan, with impressive fuel economy to boot. That was essentially VW's marketing pitch for its high-efficiency volume cars in the U.S., and it had to be maintained. Complying with regulations would have made the cars less competitive for the same consumer segments – they needed to be cheap, fuel efficient, and fun to drive. In fact, while Volkswagen had made diesels a key part of their growth ambitions in the U.S. market (holding 75% market share of diesel-engined passenger cars in 2015) (Fisher, 2015), it may have continued to implement the cheat device post-2014 in order to use the artificial numbers (concerning miles per gallon, horse power, torque, and emissions) that resulted from the cheat as a mainstay of the vehicle line’s promotion and appeal.

Reviews of the Volkswagen 2009 Jetta TDI (the earliest released model with the affected EA 189 engine and defeat device) marked the first series of authoritative assessments of the place that VW’s new diesel technology held in relation to existing consumer automobile options. These reviews, as well as other forms of journalistic coverage, are valuable in the way they illustrate through dialogue, real-world examples what makes a car “good”. Reviews of cars, specifically, define what a particular car means in terms of its ability to fulfill a role based on socially and culturally constructed values surrounding automobility (i.e. driving excitement, handling, comfort, aesthetics, fuel economy, etc.). Therefore, in understanding whether the 2009 Jetta TDI was a good car according to automotive journalists, we get an impression of how the

earliest example of clean diesel vehicles fit into cultural expectations about what defines a car – importantly how the values which make a good car translate to consumer values.

Much of the information in the journalistic coverage of the 2009 Jetta TDI (and invariably later, more-refined models) tended to address several points in common: the ideas that these new diesels were nothing like old diesels; emphasizing fuel economy, low emissions, and therefore a kind of "green-ness" (i.e. a sustainable option for transportation that would appeal to those sensitive to man-made climate change as a social issue); and, as vehicle that fulfills expectations about how an automobile should feel – as a car that appeals to quintessential values among consumers looking for a driving experience.

In a long-term review (a review written after the vehicle has been in the possession of a reviewer for an extended period of time to simulate consumer ownership, *Car and Driver* called the 2009 Jetta TDI "a VW diesel [that] proves it can be a big player on Main-Street America" (Quiroga, 2010). Comparing the newest Jetta with past models, Quiroga lauded the new model for its dramatic shift away from the "noisy, dirty, and slow automotive hair shirts" that constituted the past generation of TDI's (Quiroga, 2010). He praised the new Jetta as something "clean enough to satisfy the emissions laws of all 50 states without resorting to urea injection" and "powerful (140 horses) and quick enough (0 to 60 mph in 8.1 seconds) to satisfy us" (Quiroga, 2010). This generation Jetta, in fact, was just as quick to 60 miles-per-hour as the same model available in a manual five-cylinder gas option (Quiroga, 2010).

According to Quiroga, the "real draw" of the Jetta TDI has always been its fuel economy. The reviewer makes mention to a 39,678-mile long-term, 13-month, test, in which the Jetta TDI consumed diesel at a rate of 38 mpg. This number, Quiroga argues, "has only been bettered twice

by [*Car and Driver*] long-termers: A 2000 Honda Insight returned 48 mpg over 40,000 miles, and a 1992 Honda Civic VX got 41 mpg over 35,000 miles" (Quiroga, 2010).

Complaints about the new generation of TDI Jettas included issues regarding turbo-lag, and the responsiveness of the automatic transmission system of the dual-clutch automated manual DSG – VW eventually issued a recall for the DSG, extending the warranty from 5 years/60,000 miles to 10 years/100,000 miles (Quiroga, 2010). The last page of Quiroga's article well summarizes the consensus of reviews for the new TDI Jetta, in which he compares the Jetta TDI to a gas miserly version of VW's performance hot-hatch, the Golf GTI:

> With the exception of a few minor issues, some of which were the fault of the Jetta and some of which could be blamed on user error, the Jetta TDI managed to nearly match the efficiency of a Toyota Prius while doing a convincing cornering impersonation of a zesty GTI. One editor said it was "like a GTI that swallowed a quaalude." The diesel engine still has a few idiosyncrasies, and its slow-revving nature will bore more avid drivers, but Volkswagen has found that at least 25 percent of Jetta buyers in the U.S. are willing to go the diesel route. As long as the issues with the dual-clutch gearbox don't become more than isolated incidents and turn into a public-relations disaster, VW may find that the mainstream is ready for this diesel (Quiroga, 2010).

The above opinion was echoed in many other reviews, including *Motor Trend* who subtitled their review "Equal Parts Rangemeister and Perception Changer", with one staff writer calling it "comfortable to drive while maintaining so much more road feel than most of the competition" (Walker, 2010). CNET's automotive segment said the car was "powered by a fantastic turbodiesel engine that combines great fuel economy with good torquey performance… [it] represents a great balance of driver-friendliness and eco-friendliness" (Goodwin, 2009). Like Quiroga's review, Goodwin found the car to be "close, but not quite there yet" in terms of bridging the gap between "greenies and enthusiasts" (Goodwin, 2009). Going on to say that while he liked the "…fantastic turbodiesel engine's ability to combine eco-friendliness and good performance in a simple package without hybrid techno-trickery" he didn't think that "…the

average John Q. Driver will spend much time at the top of the EPA's estimated fuel economy ratings", making a reference to how the Jetta's driver will most likely be driving the car hard (Goodwin, 2009). This is not because the car needs to be driven with a heavy foot (i.e. with hard acceleration) but because its capacity to elicit an enthusiastic driving spirit out of its driver (Goodwin, 2009).

The following are excerpts from other review sources, which highlight the general consensus among and evidentiary pattern of comments, concerning the 2009 Volkswagen Jetta TDI. The selections emphasize the common threads identified at the beginning of this chapter: myth reversal, "green-ness", and continuity of expectation in experience.

Motor Trend:

> The diesel's clatter was present, but never intrusive. "At idle and low engine speeds, you can tell from the exhaust note that it's a diesel," logs associate Web producer Scott Evans. "But only because the pitch and cadence are different from a gasoline engine's. It's as quiet as any gasoline passenger car in normal driving, (Walker, 2009).

Driving.ca:

> I'm glad you brought up the comparison with hybrids, since I think the contrast bears sober reflection. While small hybrids have better official Transport Canada figures, I've always found diesels to achieve better real-world economy, at least with my lead foot. More specifically, the decrease in fuel economy when you drive harder and faster is fairly minimal, which often makes the diesel a better choice than a hybrid. That's why I'm a fan of the new breed of sophisticated and "green" diesels. And it's the reason I'm a fan of the 2009 Jetta TDI (Harper, 2011).

Road and Track:

> Not only did we not have to think about urea, but our TDI's 10,000-mile scheduled maintenance and unwavering dependability meant we didn't think much about anything at all. Under VW's Carefree Maintenance program, all of our oil changes and regular checkups came free of charge, which is a beautiful experience for those who suffer from service-department anxiety (Elfalan, 2010).

> The Jetta TDI is just about the perfect family car and it won't break the bank when you buy one. Only two criticisms come to mind—first, the exterior styling is a bit anonymous and isn't as well executed as the interior's. Second, while diesels have plenty of punch and can cruise effortlessly at highway speeds, they run out of breath quickly in the higher-rev range. Overall, the Jetta is both practical and spirited, which

> is an unlikely combination in a world preoccupied with hybrids (DeLorenzo in Elfalan, 2008).

Autotrader:

> Volkswagen is marketing hard to dispel the American perception of diesels as loud, stinky and slow. But all you have to do is drive the 2009 Jetta TDI Clean Diesel to know that these characteristics are a thing of the past.
>
> When the light changes, you don't exactly take off like a rocket, but the swell of diesel torque is fun to experience.
>
> That said, it's clear the TDI was designed to perform at the pump, not on twisting back roads, as evidenced by the immediate desire of the stock 205/55R16 rubber to relinquish its feeble grip on the asphalt. The brakes make a similar statement when jammed on before a tight corner ("Please stop driving like this"). Despite this, the Jetta TDI is quite fun to drive aggressively, thanks to a well-tuned suspension and good steering (Tate, 2009).

In 2008, the 2009 Volkswagen Jetta was awarded Green Car of the Year at the Los Angeles Auto Show. The award, created by *Green Car Journal*, is given to a vehicle selected by an nine-member panel comprising automotive and environmental experts, which in the past has included Carl Pope of Sierra Club, Frances Beinecke of the Natural Resources Defense Council, and Jean-Michel Cousteau of the Ocean Futures Society (Blanco, 2008). At the press release, Ron Cogan, editor and publisher of Green Car Journal and editor of GreenCar.com said that "the 2009 Volkswagen Jetta TDI epitomizes what the Green Car of the Year honor is all about" (Blanco, 2008). He went on to say that the vehicle "…Raises the bar significantly in environmental performance with its EPA estimated 41 mpg highway fuel economy, reduced greenhouse gas emissions, and extremely low tailpipe emissions". Cogan remarked upon how "impressive" that achievement was considering that "the Jetta TDI is a clean diesel, achieving the kind of fuel efficiency offered by gasoline-electric hybrids but in a more affordable way" (Blanco, 2008). Additionally, Cogan closed out the announcement by saying the following:

> Although its mission is to provide buyers a comfortable and fuel efficient five-passenger family sedan at an affordable $21,990, there's a bit of performance in the bargain because of this clean diesel engine's abundant low-end torque and the Jetta's well-tuned suspension. This Volkswagen's new-generation diesel powerplant is also

> exceptionally quiet for a diesel, reflecting just how far advanced diesel technology has come in recent years (Blanco, 2008).

Volkswagen (as well as Audi, concerning its award in 2010 for the Audi A3 TDI) would return the Green Car of the Year award to Green Car Journal in 2015, after the group rescinded its decision to award the models in light of the defeat devices which would have made them ineligible (Cogan, 2015).

Towards 2013 and 2014, while diesels were gaining more popularity within North America, and increasingly supported by other manufacturers, Motor Trend tried to address the ever apparent, but rarely-addressed question of diesel, gas, and hybrid electric vehicles: "which is most adept at delivering on its energy-conscious promise, won't break the bank to operate, and is least likely to hit you with buyer's remorse?" (Kong, 2013).

In a comparison among the Chevrolet Cruze 2.0TD (Turbo-Diesel), Honda Civic Hybrid, Toyota Prius, Volkswagen Jetta Hybrid, and Volkswagen Jetta TDI (years 2013/2014), Motor Trend qualified the five models of vehicles based on "ride and handling", "performance", "efficiency", "cockpit/cabin", "safety", "value", and "cost of ownership". This pre-scandal comparison, by one of the most popular sources of automotive journalism, serves as an appropriate barometer for evolved sentiments regarding clean diesel and its place among existent "green" alternatives among consumer vehicles.

Although the methodology behind the comparison is unclear, the conclusions were not: concerning "ride and handling", the Jetta twins were complemented on "appropriately weighted steering, reassuring suspension compliance (even with the TDI's rear torsion beam), sharp chassis reflexes, and the overall sensation of dynamic eagerness imbued into the Jetta DNA" (Kong, 2013). In comparison, the Civic was chastised for its steering system which "stunts any whiff of "fun" driving" when diving into a curve, and Prius, with its $3699 Plus Performance

Package premium option finally shock its characteristically "apathetic" handling to "uncharacteristically sporty" but still "monotonous" (Kong, 2013). The reviews of the Cruze diesel were unfortunately no less dreary: "this car has no dynamic prowess whatsoever" (Kong, 2013).

The theme continued on throughout the comparison, with the TDI model beating out its competitors for favour on most points of comparison. The conclusion of the review was most revealing: Cruze brought up the rear, last place – the only other diesel in the comparison. Interestingly, the reviewers might have been putting their feet in their mouth in 2015, after having made the following assessment: "[the Cruze] set out to bury the Jetta TDI in engine output, highway fuel economy, and cruising mannerism, but the VW nips it in the real world where it counts" (Kong, 2013).

The other losing cars fared just a little praise in comparison to the winner: the Civic hybrid was rated fourth overall due to an "ineffectual powertrain" and startlingly low fuel economy under spirited driving. The reviewers make the argument that "with the right driver, 44 mpg might be a reality", however, they suspect that "there are far more "wrong" drivers out there" who would be disappointed with the real-world numbers in their fuel economy (Kong, 2013). The Jetta hybrid took third, based on outrageous estimated cost of ownership over five years, and a lack of "premium" sense despite its actual premium in price (Kong, 2013). Second place went to the Prius, which despite offering next-to-nothing enjoyment levels for a driver, was least costly for fuel, and least likely to generate additional costs of ownership regarding maintenance (Kong, 2013).

The TDI was, expectedly, first place. The reviewers argued the Jetta TDI "punches above its weight, delivering beyond its stated ability" (Kong, 2013). They argued that the car was "easy

to live with and always satisfying from behind the wheel" and "does more with less", which they claim is ultimately is the definition of proper efficiency and therefore the reason a person buys an efficient car (Kong, 2013).

4.4 The Vibrancy of Matter and the Inseparability of Base and Superstructure

4.4.1 The Affective Capacity of Materials: Symbols and Experiences

Anthropologist and ethnographer Daniel Miller particularly, has been a major contributor to the field of material culture studies, and has both written and compiled works, extensively, on the social and cultural power of things for almost three decades. His collections like *Material Culture and Mass Consumption* (Miller, 1987), *Material Cultures* (Miller, 1998), *Car Cultures* (Miller, 2001), *Materiality* (Miller, 2005), *The Comfort of Things* (2009) and *The Global Denim Project* (Miller 2011), contain much of the work which has main-stayed anthropological engagements with material culture since the earliest proto-materialists, and parallel practitioners of post-processual archeology. These works provide a more than suitable collection of anthropological positions in material culture studies with which to assess the contribution of vital materialism.

Concerning ethnographies of materiality, Daniel Miller and others have presented through the *Global Denim* project, multiple ethnographies of blue jeans (Miller, 2011). The materiality of denim is expressed ethnographically through the cotton-elastane material of the Brazilian funk jean (Miller, 2011) which physically shapes the body and semiotically produces the seductive culture of the Funk balls in which they are worn. The materiality of denim is expressed similarly in the work of Woodward (Miller, 2011), in which jeans and their subtle material variations effectively toe the line between two potential identities of female urbanites. For Miller (2011), it is the act of denim distressing which creates an intimate and expressive

individuality as well as a kind of embodied record of the particular movements and contours of the particular body involved in distressing.

Denim, as a material, is culturally variant, expressive of norms and values through its consumption and material characteristics, reflective of personal identity and membership among larger groups, of commodity chains, labour, and production. In general, denim is reflective and constituent of peculiarities of social relationships in cultural environments. Throughout the piece, Miller and others work through the ubiquity of denim, often "directly expressive of the extremes of the modern world" (2011, p. 17). For Miller, materials, such as denim, communicate the philosophies of its wearers and users in everyday practice. It becomes the thing that speaks when its human counterpart does not have the words to express it; denim is culturally resonant and expressive of understandings of the world people live in in varied and diverse ways.

Miller and others also contributed to an ethnographic volume on the materiality of automobiles in general. *Car Cultures* (2001), presents a contribution to material studies of car culture, focusing on both the externalities of automobility, approaches emphasizing the political and economic circumstances of car production and development (methods popular in the works of those like sociologist John Urry), and its entailments, the more personal and involved relationships of the values of particular groups of drivers and passengers and their cars (Miller, 2001). Included in the volume are works that attempt to address both political economy and a humanity of the car (which some might argue is an anthropomorphism of the car which enables the discovery of its material vibrancy) constructed through the relationship of car and driver. Each ethnographic engagement deconstructs the entanglement of aspects like race, gender, mobility, consumerism, regulation, urban planning from the social life of automobiles. For example, Diana Young's contribution to the volume addresses the car as an object of property

ownership, expressive of authority, and gender, describing the problems of group ownership (Young, 2001). It depicts the dynamics of a social context in which cars are owned, used, repaired, and disposed of. In "Driving while Black," Paul Gilroy explores the car as a powerful historical, cultural, and political object and analyzes its constitution of class and race in the United States (Gilroy 2001). Additionally, Simon Maxwell's chapter on "Cars in Everyday Life" explores the social and environmental issues raised by modern automotive culture and the ways in which environmentalism is reflected in car ownership (2001, 203-222).

Miller's *Car Culture*, though older than the *Denim Project*, realizes much of the same intentions and aptly communicates its place as the precursor to the global denim project. It deals with the capacities of materials found in and around automobiles to be conduits of cultural values, and expressive bodies acting out the influences of those values within larger networks of bodies. This semiotic approach has been predominant in material culture studies, and as a basis for general approaches in considering the affective power of things, objects and materials.

As mentioned briefly in chapter three, Dant's approach to material culture of the automobile moves beyond the network and the symbolic to the phenomenological aspects of material assemblages. Dant's tertiary approach (the former two approaches being affordances and ANT, as discussed in the previous chapter) emphasizes a phenomenological perspective which is notably absent from that of Bennett and Miller. Dant draws upon Merleau-Ponty for a basis in considering the ways that cars necessarily situate and orient the kinaesthetic awareness of the body towards the outside world (2004, p. 71). This orientation is the product of continuous modification (something echoed in Ingold's approach to the leakiness of objects, discussed in the next chapter).

For Merleau-Ponty, perception is not dependent on individual senses generating "disembodied information", but rather a combinatory process which relies on the total sensory experience of the body in producing states of perception dependent on bodily memory (2004, p. 72). Visual perception, that sense which is integral to driving, is not just as the psychologist Gibson noted, a matter of the way that image of the world is deformed in the eye as it moves through space, but an orientation of the entire body to the world through which it moves (2004, p. 72). As Dant argues:

> What is perceived in the visual field is complemented by the kinaesthesia of the body and its trajectory as a whole, by the sounds of the engine, the road and the wind on the car, by the resistance of steering wheel, accelerator and brakes – even the feel of the road through the wheels of the car (2004, p. 72).

According to Dant's approach, driving is largely habitual, and in the process of learning and doing, the driver's sense of speed and what conditions of surroundings will permit becomes a skill embodied "through the vehicle, not only in dials and controls but through sounds and vibrations" (2004, p. 73). The experience of the driver-car is an aspect of bodily experience that people carry into all their other perceptions and engagements with the material world in a way that they take for granted and treat as unremarkable. For Dant, the car does not simply afford the driver mobility or have peculiar agency as an actant within a complex network; it also enables a range of humanly embodied actions available only to the driver-car.

Dant's approach to material culture exemplified in the driver-car parallels those like Miller, which approach both the affordances of objects, and their situation within complex assemblages and networks of influential actants. It also brings a phenomenological lens to material culture studies, exploring the way practical engagements in automobiles (or any matters) are generative of ontologies of practice, fundamentally altering the way drivers, when

becoming part of the assemblage, see and engage with their surroundings through a mutually constituting process.

The Volkswagen diesel is exemplary of these principles (the symbolic, and the phenomenological). The unique diesel combustion engine positioned the car center-stage to the values and expectations of consumers and mainstream automobile culture. It also served to reinforce what a car, culturally (ideologically), is. How vibrant is the Volkswagen diesel, though? Is its affective capacity tied to the expression it finds in constituting the driver-car, or the ideologies with which it interacts to produce and be produced by?

4.4.2 The Question of Vibrancy

Some criticisms arise from Bennett's approach to conceptualizing vibrant matter, both internally, and with regards to its question of uniqueness in the face of so many other approaches to material cultures, both inside and outside anthropology. One prominent example is the question of what Bennett means by her conceptualization of vibrancy. As she describes it, vibrancy is the affective capacity of material:

> …Affects create a field of forces that do not tend to congeal into subjectivity. What I am calling impersonal affect or material vibrancy is not a spiritual supplement or "life force" added to the matter said to house it. Mine is not a vitalism in the traditional sense; I equate affect with materiality, rather than posit a separate force that can enter and animate a physical body (2010, viii) (emphasis mine).

In both her preface and introductory chapter, Bennett qualifies the concept with the notion of thing-power and out-side.

> thing-power gestures toward the strange ability of ordinary, man-made items to exceed their status as objects and to manifest traces of independence or aliveness, constituting the outside of our own experience… how found objects can become vibrant things with a certain effectivity of their own, a perhaps small but irreducible degree of independence from the words, images, and feelings they provoke in us. I present this as a liveliness intrinsic to the materiality of the thing formerly known as an object (2010, viii).

In her discussion of debris in chapter 1, Bennett engages with roadside litter describing it as "stuff that commanded attention in its own right, as existents in excess of their association with human meanings, habits, or projects… as vivid entities not entirely reducible to the contexts in which (human) subjects set them, never entirely exhausted by their semiotics" (2010, 3). Thing-power, she writes, is "the curious ability of inanimate things to animate, to act, to produce effects dramatic and subtle" (2010, 6).

What is apparent by her treatment of things, in these chapters and throughout her book whether it be with electricity, bodies (diets, microbes, intentions, etc.), metals, and stem cells, is that this vibrancy (which often becomes synonymous with vitality) is an object's capacity to evoke changes, actions, and circumstances independent of human agency. As she quotes Sullivan's garbage hills from Meadowlands on page 6, vital materiality can never be thrown away, for it continues on its activities, producing underground methane pockets seeping into the ground and eventually finding their way towards feeding forest fires or eating away at ozone. But what are the limitations and expectations for accounting for this vibrancy?

Considering matter as an agent that is vibrant, i.e. that can potentially generate its own power and create chaos, change, and meaning outside controlled boundaries, Bennett helps us to explore new perspectives for including matter in understanding social politics. However, as anthropologist Nadia Bartolini has addressed, homing in on certain types of matter that are inherently vibrant, begets an assumption that all matter is always vibrant "…Without having to think through the meanings associated with such vibrancy" (Bartolini, 2015, p. 192). Bartolini asserts that as Bennett's engagement with how matter, such as the energy and movement contained within atomic structures, can actively be and become vibrant without the intervention of social construction or meaning, her task obscures certain kinds of matter. For Bartolini, matter

classified as heritage, which is already imbued with social construction, sees Bennett's position as one which undermines the processes through which materials are combined to produce vibrancy. She also argues that by focusing on how matter is inherently vibrant, one may drift into the precarious bifurcation of the dull and the vibrant, which in the end remains unhelpful without demarcations which elaborate on the character of vibrancy in different kinds of matter (2015, pp. 192-193).

Bartolini presents an interesting phenomenon with which to explore emerging questions on vibrancy, particularly in the context of tangible urban heritage. Bartolini explores how the term 'vibrancy' can be explored and in what material circumstances it can inform us within the context of a World War II bunker in Rome. In this case study, her article seeks to unpack the different ways that materials exhibit vibrancy. While this is also one of Bennett's aims, Bartolini suggests that social constructs should not be ignored in the pursuit of finding out the contingencies of vibrancy, especially when considering tangible urban heritage. She explores these contingencies through a contemporary art exhibition in Mussolini's bunker in the EUR (Esposizione Universale Romana) neighbourhood in Rome. The case study reveals that vibrancy was produced in a number of ways through the nature of concrete, considering the social constructs involved, assessing the politics of vibrancy through the exhibition, and by localizing the bunker within Rome's fabric (2015, p. 193). She concludes, "rather than suggesting that all matter is vibrant, considering the geographical, social, political and natural forces at play makes it then possible to shed light on the impact of tangible heritage on cities and communities" (2015, p. 207-208).

More recently, and more along the lines of what Bennett engages with inside the discipline of material culture studies, is the approach of anthropologist Tim Ingold, who is more

concerned with materials than with objects or things per se. Ingold has contributed to delimiting the discipline's internal disputes over rhetoric and linguistic devices for categorizing non-humans on the basis of their active characteristics (that is what they do, rather than what they are).

In a 2012 issue of *Annual Reviews*, Ingold, anthropologist and another major proponent of material culture studies, explored the several decade-long trend of material culture focuses, as well as provided the basis of his position in material culture studies which would appear later in his work *Making: Anthropology, Archaeology, Art and Architecture* (2013).

In his article he argues that despite advances in the fields of material culture studies and ecological anthropology (which has long been interested in the physical world in which humans find themselves situated among multitudes of material bodies), both fields continue to talk past each other (Ingold, 2012). He argues that general trends in the recent study of material culture show three characteristics: (a) "material culture studies continue to operate with a conception of the material world, and of the nonhuman, that focuses on the artefactual domain at the expense of living organisms", (b) "the prevailing emphasis on materiality obstructs our understanding of the fields of force and circulations of materials that actually give rise to things and that are constitutive of the web of life"; and (c) generative of "a conflation of things with objects that stops up the flows of energy and circulations of materials on which life depends" (2012, pp. 426-428). Often, these characteristics are imbued with the practically noble goal of breaking down a subject-object dichotomy which has nonetheless already been dismantled for many decades (2012, p. 436).

Ingold argues that in every case so far in the studies of material culture, there seem to be two sides to materiality. On one side is the brute materiality or "hard physicality" (Olsen in

Ingold, 2012 p. 432) of the world's "material character"; on the other side is the socially and historically situated agency of human beings who, in appropriating this physicality for their purposes, imbue in it both design and meaning, converting it from naturally given raw material into the finished forms of socially-charged cultural artifact (2012, p. 432). He posits that to understand matter, we should engage with it like the alchemist rather than the chemist, understanding not what a material substance is, but what it does in its varying contexts and situations, i.e. focus on the active materials that compose the world and their interplay – their inherently "leaky" qualities which are not fixed, not stable, but sustained by the continuous taking-in and giving-out from the materials around them, a kind of material metabolism (2012, p. 434).

Ingold proposes, additionally, a kind of taxonomy of material cultures, which looks to delimit different kinds of non-humans. He argues that artifacts are objects thought to be made rather than grown, in keeping with contemporary archaeological thinking. The body, consistent with Merleau-Ponty and Dant, is "a dynamic center of unfolding activity, rather than a sink into which practices are sedimented" (2012, p. 439). Likewise, materiality falls into two categories: i) the "brute materiality" of the physical world; ii) its existence in human appropriation. Likewise, materials is the stuff of materiality; matter considered in respect of its occurrence in processes of flow and transformation. Nonhumans serve as an alternative for "made objects" or "artifacts" though nonhumans should also include living organisms of all kinds. The definition of objects is derived from Heidegger, and are completed forms that "stand over and against the perceiver and block further movement" (2012, p. 439). Finally, things are gatherings of materials in movement, as distinct from objects. In other words, materials which have not yet coalesced and stopped in their movements and action, potentially reconcilable with Bennett's vibrancy (2012, p. 439).

In this context, the vibrancy of the TDI is produced not only in its role as constituting the driver-car assemblage, but also as something which moves to produce other changes outside of human meanings. The question, which Bartolini would pose, is how vibrant is the TDI vehicle outside of its human-object assemblage? The TDI vehicles (and assemblage of actants which constitutes it), reflects a reality which it actively produces the outside of human experiences. In consumption specifically, the TDI behaves like the concrete that Bartolini addresses – its physical form facilitates some activities and ideas and hinders others that actants, both (human and non-human) that are engaged with it. Similarly, it provokes ideas and values, constitutes them – provides humans with the experience which constitutes a car, not only through being the object onto which ideas and values are projected.

Bennett's vibrancy applies, however, equally to what Ingold would call materials, things, objects, and artefacts – it looks to be applied uniformly, regardless of any taxonomy of matter. In this sense, Bennett's vibrancy is therefore not guilty of this third criticism levied by Ingold – a conflation of things with objects – because it does not assume the existence of such a distinction in the first place. Essentially, it takes for granted that matter is always in flow. This is the issue with Marxist interpretations of base and superstructure – where one ends and the other begins is an impossible separation.

4.5 The Inseparability of Base and Superstructure

4.5.1 Historical Materialism and Marxism: Dialectical View of History

It was Engels who first formally elaborated on the dialectical theory of history in a work called Anti-Duhring (1976), writing that the central principle of the technique was in the concept of interconnections (Morrison, 2006, p. 139). According to this position, the natural world and the human world appear as a set of interrelations within time. Relational concepts such as

humanity, history, experience, existence, etc. allow people to visualize these connections as an endless maze of interconnections in which 'nothing remains as it was, but everything moves, changes, and comes into being and passes away' (Engels in Morrison, 2006, p. 139).

Marx's dialectical theory of history was a stark departure from that of his predecessor Hegel. Firstly, while Hegel believed that social development and change occurred through the change of ideas, Marx's view held that, as the material world necessarily preceded the ideological, then social changes and developments takes place on the basis of changes in the material conditions of existence within historical processes (2006, p. 144).

Second, Marx held that contradictions (which were central to Hegel's position), were manifest historically in concrete form through coercive class structures, expressing themselves through class struggle within economic relations (2006, p. 144).Third, these class struggles were present historically in societies around the world. While Hegel believed also in stages of social development, his explanations remained in theoretical abstraction. Marx, decidedly expressed that since historical development of society were expressed in economic relations, the stages of development could be tangibly real – hence Marx's conception of the ancient, feudal, and capitalist stages of society (2006, pp. 144-145).

Fourth is the concept of 'relations' and the web of interconnectedness of the social and natural worlds. For Marx, the concept of relation was an analytical tool, allowing him to examine the each relation from two perspectives, from that of the relation to oneself, and from that of the relation between oneself to others and to the world (2006, p. 145). Marx uses this relationality in Capital, exploring economic categories of labour, capital, and production to define interrelated economic activities.

4.5.2 Historical Materialism and Marxism: Base and Superstructure

Historical materialism (and the dialectical theory of history) prescribes that the physical world (materiality) exists within the base of society (i.e. the material conditions of production). In contrast, the ideologies (discourses, art, philosophy, religion, political institutions), etc. forms part of its superstructure (i.e. its culture and social institutions). In Marxist theory, the base is always the first cause of elements of the superstructure or culture, based on the premise that humans must first satisfy basic material needs of food, shelter and warmth before anything else. The relationship between the elements however reflects the theoretical assumption that changes in each of the entities effect change in the other across time, until in the last instance where the base will always provoke the change in the superstructure.

Historical materialism, emerging as a philosophical position in Marx's writings after his break with the traditional German philosophy of Hegel, is both a methodological and theoretical position which looks at human problems by observing the real and physical conditions of existence, particularly those related to the satisfaction of economic needs. Society and history, therefore, are premised on the never-ending sequence of actions of production and consumption which can be conceived of as a metabolic relationship (Marx, [1845] 1947, p. 16). In this sense, productive practices contribute to a "making of" the world in which they exist.

According to Marx, the base of a society consists of both the forces and the relations of production, which together constitute the mode of production. The two constituents are in effect, the physical and social elements of the base: the forces of production consist of the physical elements of economic relations, the raw materials, the technology, the land, etc. to which labourers add value through labour. Conversely, the relations of production are the set of social relations which social classes of society (based upon relationship to the means of production) are

arranged productively. The mode of production is the conceptual schema which refers to the combination of both the means and relations together into productive activity – the combination of the social division of labour, tools, technology, land and the systems of property which govern them in relation and constitute the total way of economic life within a given society (Marx, [1867] 1985, pp. 20-21).

Integral to this basic constitution of the whole of society is Marx's argument that, historically, only one class of persons has always owned the means of production, and that this condition of ownership leads to the division of society into economic classes. Marx's argument additionally concerns the relations of production. As Marx was concerned that social roles were predicated on the relations of social classes with respect to the means of production, the corollary of the concentration of ownership of the means within one class would create only two distinct roles in productive society: producers and non-producers of physical labour. This would compel those who must engage in productive physical labour (through a dependency on the owners of the means to reproduce himself) to enter into a subordinate relation of production with the owners of the means ([1845] 1947, pp. 8-13).

Ideology, i.e. superstructure, as I presented earlier, was in Marx (and Engel's) work dependent on material reality. According to the historical materialist perspective, material production is paramount in that it keeps people alive through the formation of material connections and relations to the world and the inevitable life processes. In keeping with this, Marx felt that all ideas and conceptions reflected this activity; our ideas and conceptions are lenses through which we come to see the world and understand it. For Marx, people in society never encounter the physical world directly, but always through prevailing conceptions and beliefs that originate from material production. What this means is that any and all perceptions of

reality is always the product of a filter created by economic and material conditions, through which we always see things in terms of the values and beliefs that are related to the dominant or prevailing economic relationships within society (Morrison, 2006, pp. 65-66).

One particular example of this is in Marx's criticism of Feuerbach in *The German Ideology*, in which he addresses Feuerbach's perceptions of homelessness through his own materially produced ideologies regarding philosophy and economy. For Marx, in a society in which work, productivity and commerce are paramount activities, those inside of it tend to regard the world around them in terms of positive productivity and degrading idleness ([1845] 1947, p. 37) (2006, p. 67). Other good examples in Marx's work highlighting the relationship between base and superstructure lay in his analysis of property in land.

For Marx, land is the first and foremost expression of proprietorship as the "arsenal which provides both the means and the materials of labour, and also the location and basis of the community" (Marx, 1857, p. 69). Productive relations serves as the basis for modes of appropriating land and its qualities as a form of property, as Marx writes in the case of tribal modes of production: "Hence the tribal community, the natural common body, appears not as the consequence, but as the precondition of the joint (temporary) appropriation and use of the soil" (Marx, 1857, p. 68). Again, as Marx describes it with respect to the ancient roman modes of public and private proprietorship: "to be a member of the community remains the precondition for the appropriation to land…his relation to his private property is both a relation to the land and to his existence as a member of the community" (Marx, 1857, p. 73).

For Marx, the social character of matter is produced through human engagement with those material elements outside of the person as an individual – not only in the sense of common or private in the context of land, but also as a reflection of the character of the person who stands

in productive relation to that object, as Marx points out with regard to the Roman mode of proprietorship: "Among the ancients we discover no single enquiry as to which for of landed property, etc., is the most productive, which creates maximum wealth. Wealth does not appear as the aim of production…The enquiry is always about what kind of property creates the best citizens" (Marx, 1857, p. 84). As he continues on,

> Wealth is on one hand a thing, realised in things, in material products as against man as a subject. On the other hand, in its capacity as value, it is the mere right to command other people's labour, not for the purpose of dominion, but of private enjoyment. In all its forms, it appears in the form of objects, whether of things or of relationships by means of things (Marx, 1857, p. 84).

What Marx points to, with regard to Roman proprietorship is a peculiar manifestation of the moral quality of property. In text, he juxtaposes the concerns of capitalist landed-property of surplus wealth with those of antiquity, who judge the worth and purpose of property in so far as it contributes to the political animal. What follows from the materialist conception of ideology is that within Roman society, the particular manifestation of the mode of production existed in such a way which produced the ideological conceptions of land and productivity (i.e. measured in terms of good citizens rather than wealth) and that there is something in the particular arrangement of the mode of production under capitalism (explicitly the mixed forms of modern state-capitalism that Marx had experienced) that produced wealth-centric social values of productivity.

Marx discusses this thesis in light of what appears to be a linear historical progression of modes of production and their inevitable regimes of property; in essence a hierarchy of social organization which moves through different stages of modes of production and proprietorship. For example, with regard to movement from Asiatic, Slavonic, ancient classical, and Germanic forms (Marx, 1857, pp. 68-80, 95) (1988, pp. 55-56). The existence of a rigid linear development

path is, however, much disputed and considered by many not to be Marx's intention (Anderson, 2010).

What remains important in these writings is the notion most succinctly expressed on page 93:

> The act of reproduction itself changes not only the objective conditions – e.g. transforming village into town, the wilderness into agricultural clearing, etc. – but the producers change with it, by the emergence of new qualities, by transforming and developing themselves in production, forming new powers and new conceptions, new modes of intercourse, new needs and new speech (Marx, 1857, p. 93).

4.5.3 Creating Mobile Subjects in Matter

As discussed in chapter two, Paterson makes a point to address automobiles, particularly from the perspective of the rise of the automobile, which he explains in terms of "…the intertwining of the particular developments of capitalism in the 20th century [and] the production of particular types of individuals attuned to constant mobility" (2007, p. 91). In doing so he argues for a "more adequate account of why cars have become so dominant" (2007, p. 92).

On the latter point, concerning the creation of mobile individuals, Paterson as well as other scholars argue that alongside the production of the car and its promotion by the state, there has been a simultaneous production of type of person – namely one oriented towards the kind movement that cars entail. In keeping with the perspective of the Marxist dialectic in combination with post-structuralism, Paterson argues that cars reproduce an orientation to mobility and flexible movement as a positive social value (2007, p. 121). Essentially, in its role in reproducing capitalism globally, the car has simultaneously defined "modern subjectivities as existing principally through movement itself" – i.e. that the modern subject is a mobile subject (2007, p. 121). This culture of automobility, or in Marxist terms, its super-structural element, is defined by the connection between cars and ideological elements (particularly in the order of modernity through liberty and dominance) (2007, p. 121, 142). These claims are echoed in much

earlier works concerning the car's symbolic characteristics, particularly the edited volume, *The Motor Car and Popular Culture in the Twentieth Century* (Thoms et al., 1998).

Paterson makes this claim for a number of reasons: 1) the inherently political issue of movement – the creation of productive bodies through accelerated and controlled movement (i.e. "proscribed, constrained and limited") (2007, pp. 126-127); 2) that cars "liberated" consumers from the rigid and bureaucratised timetables of trains in the twentieth century, effectively becoming a cultural symbol synonymous with speed as well as "freedom and escape from the constraints of a highly disciplined urban, industrial order" (2007, p. 132); 3) the role of the automobile in the Second World War as an important strategic resource (particularly concerning rearmament and mobilization of forces) and therefore of military strength (i.e. dominance) (2007, p. 133-135); and, 4) the feedback loop (from superstructure to base) generated by the 'automobile subject', the valorization of automobility, produced by popular culture in literature, music, film, and advertisement (2007, p. 142-147).

Just as dominations necessitate subordinations, the inevitable corollary of the domination of movement within a capitalist political economy is the subordination of certain subjectivities to that movement. Walks, for example, argues that while the automobile has expanded social mobility (for those who can afford it), it has also meant a significant "refashioning of the very space within which it travels" (Walks, 2015a, p. 5). The demands of automobilized travel are increases to flow, efficiency, and speed that significantly reduce the viability of competing modes of travel, and shape contemporary urban spaces and the places around them (2015a, p. 5-6). It is these places, rather than the automobile itself that "coerces people into intense flexibility" (Urry in Walks, 2015, p. 6). In doing so, it makes the principle of flexible mobility not an exception to modern working bodies, but a necessity. In the process, it often makes the

automobile an object of "compulsory consumption" (Soron in Walks, 2015, p. 7). In this sense, the automobile is no longer a messiah, offering liberation from the confines of rigid industrial capitalism, but as Urry puts it, an "iron cage of modernity, motorized, moving, and domestic" (Urry in Walks, 2015a, p. 6).

Gramsci too spoke of the subjectivities produced in the culture of automobility, or at least the culture of Americanism which emerged out of the Fordist mode of production. Particularly, Gramsci made this claim in the context of Americanism as a force which was changing Europe: "America, through the implacable weight of its economic production (and therefore indirectly), with compel or is already compelling Europe to overturn its excessively antiquated economic and social bias" (Gramsci, 1971, p. 317).

Whether the automobile is a liberator or a subjugator may be dependent on social class: geographies of automobilized societies tend to disadvantage the economic lower class in particular through a number of factors, including cost, and pollution. For example, vehicle travel increases with income, and the relationship between income and automobility may be reflexive (i.e. unemployed individuals may not have a car if they are unemployed, but may need a car to secure employment) (Martin, 2015, p. 29). Lower income households are also disproportionately subjected to the harmful by-products and pollutants generated within an automobile society (2015, p. 31).

In addition to fundamentally reshaping social geographies, the dromocracy has resulted in creating particular political animals. In the material conditions of automobile existence, a particular kind of citizen is created in terms of its alignment with automobility (in the context of Paterson's work, the degree to which the political subject is a 'mobile subject') (2007, p. 166). Paterson, for example, shows how those who were motivated to take up social activity against

the building of roads in the U.K. were intimately connected to performative identities at odds with mobile subjectivities (2007, p. 180). In Paterson's example, protestors against particular "problems" regarding automobility effectively mobilize their own subjectivities as a shared and collectivist orientation in resistance, through which opposing car-dominated societies is a simultaneous attempt at opposing the subjectivity of automobility itself (2007, pp. 181, 184).

Similarly, in the lead-up to and aftermath of Paterson's particular example (the 1997 UK 'Swampy fever' issue), many of the principal signifiers used in the 1997 UK general election political affiliation measures defined voters in terms of their cars (2007, p. 185). Political mythologies used in Blair's campaign surrounding class and the ownership of particular makes and models of automobiles permeated the popular culture of the time, although in no case was it the first time that the affiliation between car and car owner were politically meaningful (2007, pp. 185-187). Paterson's examples attempt to illustrate the connections between consumption as signification of membership in society and as ones orientation within that society. In his expositions, Paterson also argues that it also signifies how "certain consumptive patterns are privileged in political discourse" (2007. p. 188). Car ownership in particular reflects a political "middle", which simultaneously legitimizes and normalizes car ownership, but also its affiliated social, economic, and ecological inevitabilities (2007, p. 189). When put into practice contradictions emerge: these politically normalized and legitimized practices make it difficult for political policies to then address and deal with the issues created by them (2007, p. 189).

In a similar position, Walks (2015b) argues that regimes of automobility persist because of the strong support provided by significant proportions of the population complicit in producing "auto hegemony" (2015b, p. 199). The creation of the post-war suburb, as Walks puts it, means the creation of the suburban politics: "associated with support for fiscally and socially

conservative Republican politicians" (2015b, p. 200). Since 1979, rising populations and levels of representation in suburbs has meant that politicians increasingly target their platforms towards suburban voters (2015b, p. 204). In many cases, it has been automobile ownership rather than homeownership that has superseded as a variable predicting conservative political bias in Canada and the U.K. (2015b, pp. 208-209).

4.6 Conclusions

The trend shift in automobile consumption, even explored through the lens of marketing research, reveals interesting connections between certain cars and certain consumer values – only some cars receive "love", are anthropomorphised, are taken in and accepted as being exemplary of all the valued experiences which define the cultural phenomenon of a good or even great "car". Volkswagen is integral this discussion, and its rise in popularity, is inextricable from its material forms and connections, and the way these connections are articulated within ideological frameworks.

The so-called "real-world" is a point of concern in this discussion. In the way diesels surpassed consumer expectations because of the way they were driven, likewise the way hybrids disappointed. Car manufacturers measure mpg and emissions based on an imagined driver, one who accelerates gently, and who drives conscientiously and conservatively. Regulators too, play a part in this real world – one in which green-house gasses, rather than particulate emissions, define the imminent destruction of the planet.

Real drivers, however, aren't generally like this imagined consumer. They enjoy the thrill of acceleration and of speed in driving, a fact exemplified in journalism discussed in this chapter. They are tied to preconceptions of the constitution of the automobile, which simultaneously defines what cars constitute that experience, and is defined by them. The Volkswagen TDI filled

this role, by constituting and reinforcing the experiences which define that quintessential car. The ideologies which are found in Paterson's exposition of subjectivities are not only created in the abstract and general qualities and capabilities of the car (i.e. its apparent provision of freedom from regimented train systems, or its role in battlefield domination), but the phenomenological and symbolic character which it generates that is peculiar and particular to the material assemblages, both physical and ideal, in which they are constituted.

Miller's work on car cultures is exemplary of the issues discussed in chapter three, as well as this fourth chapter. The character of cars and particular components of cars to act as conduits of cultural values is not due to cars in abstraction, but cars in specific material forms. Each form, specifically, has the capacity to alienate – to position its labourer or its consumer against it – or to become the object through which a person defines him or herself.

Similarly, the context of that consumption (or production, though that is much less addressed here) is expressive of the inseparability of material base from ideological superstructure, as Dant and Bartolini's criticism of Bennett make this point well. The phenomenological perspective of the driver-car assemblage provokes a concern as to how solidly we may draw the line between material base and ideological superstructure. While Marx argued that it was the relative position to the means of production which determined (or at least influenced) which lens we as people use to judge the world around us, the perspectives mentioned in this chapter (Dant, Miller, Bartolini, Redshaw, Gramsci, and to some degree, Paterson) effectively present as possibility that it is not beyond the capacity of objects themselves to play an active role in producing that lens of perception and even habit – effectively, the subjectivities of varied automobile political economies.

5 Chapter: Conclusion/Discussion

5.1 What Bennett Brings to Material Studies

With everything out on the table about vibrant materialism, and prevailing theoretical positions in studies of material culture, it becomes much easier to highlight the potential application of Bennett's approach within a wider disciplinary dialogue. The first contribution is in the area of material vibrancy. What vibrancy does is encourage further exploration of the capacity of materials to produce change and affect beyond the generally conducted semiotic work. Though, that said, the relevance of work like that of Miller, and the critiques provided in the work of Bartolini, emphasizes the need for both semiotic approaches and material network approaches in understanding the extent of networks in which all materials are engaged together. As Bennett writes about free-will, material bodies are not without their social constructions, pushing them in certain directions and propensities for actions, neither are cars, trees, denim jeans, and electricity without theirs in varying degrees. If then vibrancy is a reframing of existing ideas, the question remains is it a valuable rhetorical distinction? Ingold seems to value linguistic clarity – so perhaps vibrancy will have its own place within the taxonomy of material culture studies. My own recommendation after reading the literature would be as an interpretive measure of a material or object's affective capacity within a network – for example, objects may be said to be more or less vibrant than others in the ranges or intensities of their tendencies and activities.

The second area of contribution is in the political. The overarching claim that Bennett makes is that attuning ourselves to nonhumans, and a notion of distributive agency, is a viable way of approaching events that harm. This applies to events that would under previous circumstances be seen as moral or good. There is already a plethora of material culture studies on

the contribution of materials and objects to the construction of cultural practices, as seen in the examples by Miller, Dant, and Ingold, but not so much work has been done which explores the capacity of harmful events with respect to vibrancy of materials. Bennett's approach would be most valuable, arguably, in an anthropology of temporally sensitive political events.

Distributive agency also addresses the characteristics/criticisms of existing studies of material culture as discussed by Ingold (2012): in horizontalizing the approach to human and nonhuman actants, Bennett attempts to give equal credit to both the artefactual domain and that of living organisms. While Ingold argues that "the prevailing emphasis on materiality obstructs our understanding of the fields of force and circulations of materials that actually give rise to things and that are constitutive of the web of life" (2012, p. 439) Bennett's approach emphasizes that circulation and calls it vibrancy in order to reify it as an observable phenomenon, in much the same way that Ingold does. Ingold also criticizes "a conflation of things with objects that stops up the flows of energy and circulations of materials on which life depends" (2012, p. 439). Bennett does not distinguish between objects and things, and at no point is an object ever complete or ceasing its circulation. According to Bennett, all matter is in a state of exchange, in the production of affect via networks. For this reason Bennett is not guilty of a conflation of two distinct types of matter, rather there is only one type. Bennett's work is unlike Ingold's – by abstaining from a distinction between artefacts and materials, Bennett's perspective always assumes matter in flow. For Bennett, essentially, matter never ceases its flows or capacity to induce change in other materials, and therefore presents a much more sensitive approach to the capacity of matter in producing social/physical reality.

5.2 Discussion: politically meaningful blame and sustainable futures

At the end of the story, we are now, again, confronted with the question of blame – on whom does it fall? As I mentioned at the end of chapter three, there is clearly an onus on the consumer as well as the government or corporate actants, as the one who drives the demand for the cars produced, who determines what constitutes a good and bad car in his or her experiences with that car. As Bennett quotes Brumfield, however, "all agree that agency refers to the intentional choices made by men and women as they take action to realize their goals," even though "these actors are socially constituted beings embedded in sociocultural and ecological surroundings that both define their goals and constrain their actions" (Brumfield in Bennett, 2010, p. 29).

What is clear, is that neither party acts alone, and while all actants may be said to be equally responsible for constituting the reality, there are some actants who can take into account this interrelation and constitution, and react to this. In this, we develop a politically meaningful result from exploring the extent (or at least, the expanded version) of the list of actants involved. Cars, capitalism, states, consumer values, rhetoric of advertisement, driving behaviours and ideas about what constitutes a good car all present themselves as partners in the appearance of the diesel scandal and the issue of sustainable automobility more generally.

It is clear, by this example and the many others of political economy (both by Marx and his interlocutors) that the state is not a paternal entity with fiduciary attitudes – it mediates the interests of society in a way which effectively neutralizes them and manages them so that the existing economic relations and structures may continue with limited interference. On the other hand, the corporate entities participate in the economic structures in which they find themselves in the only way they can – in the interest of profit.

We might argue that the diesel scandal was caused by states failing to provide the necessary oversight for manufacturers, we might argue that the manufacturers neglected public health and legal mandates, we might also argue that consumers demanded cars which were opposed to public health, and ecological sustainability. The cars themselves played a role in producing these dynamics, by being quintessential automobiles, by having mass-produced chassis, by belching out the particulate emissions, and by being the objects which facilitated and even co-produced the expectations that consumers have regarding automobiles, but the blame cannot rest with it alone, rather with the driver-car.

State regulations, corporate politics, and economic demands shape what a car is, and what kinds of cars consumers are interested in. Paterson's explanation of the political economy producing mobile subjectivities is exemplary of this. Consumers then demand automobiles which provide them with the feelings they expect, the material composition of cars and the comparison of VW diesels to hybrids makes this point well. Fundamentally, however, these feelings are opposed to a sustainable future of automobile travel. The prevalence of "automobility" is political economic, but the fact that cars are ideological equivalents to ideas of modernity, freedom, and domination, is not an inherent characteristic of cars. The "car" is a car of a certain form, a particular material assemblage, and the currents which surround what cars to buy are informed simultaneously by that cultural superstructure, as well as material forces (emissions regulations, cost, production cycles, aesthetics, and phenomenology).

The question of what kind of blame is most effective, politically, lingers. The act of blaming itself serves two purposes in the context of these contradictions of automobility, in my judgement: 1) it singles out an element which bears responsibility; and, 2) removes, alters, or exacts restitution from that singled-out entity. In light of Bennett's perspective, this is no longer

a productive exercise, the network of actants is far too large, and no one entity is more or less responsible; the situation is the product of the assemblage.

We might be tempted to blame the driver-car, and effectively address the human component of that assemblage in keeping with a Marxist perspective of the human species. For Marx, what sets humans apart from other animals is that consciousness of our own actions in the context of the history of our species, and therefore it is up to humans to be conscious of the ramifications of those actions with respect to their broader network connections. There is, however, the issue of exactly how much consciousness can transform the affective capacity of materials.

More productively, I would argue that we should consider, in light of Bennett's perspective, that transportation policy which seeks to moderate the emissions of cars in manufacturing effectively targets a fictitious human element – the ideal driver. It fails to address that cars are created by the drivers and the vehicles, and it is that assemblage of driver and car, which is effectively incompatible with intentions towards sustainable transportation. Moderation of vehicles in production should rather focus on producing the ideal driver.

The reality is complementarily explained by the political economic perspective, i.e. in the contradictions of capitalism, which cuts off its nose to spite its face; capitalism drives the competitiveness of producers, socially frames the car as an instrument of dominance, and contributes to the construction of certain kinds of cars which in turn create drivers expecting speed, power, dominance, who define themselves in their aggressive driving habits and interactions (both with their vehicles and the world outside them). These values, however, are positioned against other interests (public health, safety, and concern for the natural environment).

5.3 Conclusion

In chapter two, I proposed this project, an analysis of the materiality of Volkswagen's diesel car in North America. Beginning with an account of the details of the Volkswagen diesel scandal, I set the stage for the theoretical engagements with old and new materialist approaches in social science, and established a basic list of characters: the defeat devices, diesel fuel combustion, state policies and regulations, automobiles, corporate executive structures, capital, and American cultural myths.

In addressing whether objects produce reality independent of the meanings we give them, I juxtaposed the Marxist theoretical lens regarding the status of objects against it. Through that, and an analysis of Mintz' *Sweetness and Power*, I argued that Bennett's perspective has a lot to offer political economic approaches in the way of specificity, and complementing political economic approaches to the study of commodities with added depth and clarity.

In chapter three, I addressed Bennett's other major tenet: that the attenuation of blame spreads across networks of actants. Through a much more comprehensive network of actants involved with the diesel scandal, I argued that the attenuation of blame within networks of humans and non-humans is problematic, but aids observers to expand the range of possible relationships of causality. Marxist perspectives are too abstracted and are qualified in light of specific material assemblages. Similarly, the blame which is traditionally bestowed upon the state or capitalism itself, moves towards the vehicles and the assemblage of the driver and car which forms in the material relationship between automobiles and their drivers.

In chapter four I explored the possibility that, in light of Bennett's perspective, some things are more vibrant than others. I agreed with one of Bennett's critics, Bartolini, that social

constructs should not be ignored in the pursuit of determining and exploring the contingencies of vibrancy, and explored this implication with respect to Volkswagen TDI vehicles.

My overall conclusions within this project are were both theoretical and practical. On the theoretical side, the value of Bennett's perspective to anthropology and to existing materially-inclined perspectives (historical materialism and political economy). On the practical side, the value of Bennett (and new materialist) approaches to understanding both the Volkswagen diesel scandal and the political economy of automobility more generally. I argued that Bennett has two major contributions: the concept of vibrancy (as distinct from vitalism) and the concept of distributive agency.

Vibrancy constitutes more of a kind of reframing of existing ideas by encouraging further exploration of the capacity of materials to produce change and affect beyond the generally conducted semiotic work. I also argued that the relevance of work like those of Miller, and the critiques provided in the work of Bartolini, emphasize the need for both semiotic approaches and material network approaches in understanding the extent of networks in which all materials are engaged together. In the context of Ingold, too, it seems that vibrancy adds value linguistic clarity in identifying material affect.

The second area of contribution, the political, is one of Bennett's major undertakings, and integral to an important discussion held as the end of this project. In attuning ourselves to nonhumans, and a notion of distributive agency, we undertake an alternative way of approaching events that harm. While, there is already a plethora of material culture studies on the contribution of materials and objects to the construction of positive cultural practices, not so much work has been done which explores the capacity of harmful events with respect to the affective capacity of materials. I argued that the legislation which attempts to moderate emissions by producing the

desired car fails, and should rather be oriented towards producing certain types of drivers, i.e. considering the role of materials in producing the behaviours that harm, producing behaviours rather than products.

This point is also important in light my practical conclusions: that Bennett (and new materialism interlocutors more generally) encourage a more comprehensive engagement with the materials which contribute actively to political harms like the Volkswagen scandal and how, in understanding those specific instances of harm, we develop a much more comprehensive look at the political economy of automobility more generally. As discussed, when used in the context of the Volkswagen scandal, there is a much a greater range of causally-related entities that emerge: the technologies, the regulations, the corporate executives, the contradictions of capitalism, the drivers, and the diesel-engined cars themselves. Through this larger network of agents, I argued how an affective capacity of Volkswagen's TDI cars to resonated with drivers and produce the realities of automobility – through legacies of diesel in America, through driving experiences, and through co-creation of the quintessential "good car".

I also explored how specific material assemblages serve to reinforce Marx's conception of alienation. Specific objects serve to alienate some through the competitive actions of those who labour to produce it, and define the identities of others – specifically those who avidly consume it.

These conclusions lend themselves to understanding the dynamics of the wider political economy. As discussed previously, only some cars receive "love", are anthropomorphised, are taken in and accepted as being exemplary of all the valued experiences which define the cultural phenomenon of a good or even great "car". Volkswagen is integral this discussion and is inextricable from its material forms and connections, and the way these connections are

articulated within ideological frameworks. This rise, still, is not external to the relationship between the state and civil society, created within the contradictions between the states role as a custodian of prevailing economic organization and its role in mediating the interest groups of society.

Bibliography or References

Agencies. (2015, November 10). *Porsche SE profits down by half in wake of VW emissions scandal*. Retrieved from The Guardian (UK Web Version): http://www.theguardian.com/business/2015/nov/10/porsche-profits-cut-in-half-amid-vw-emissions-scandal

Arison, G. (2015, November 17). *Yes, Millennials Do Buy Cars*. Retrieved from Tech Crunch: http://techcrunch.com/2015/11/17/yes-millennials-do-buy-cars/

Appadurai, A. (1988). *The Social Life of Things: Commodities in Cultural Perspective*. London: Cambridge University.

Ball, J. (2014, March 12). *The Proportion of Young Americans Who Drive Has Plummeted—And No One Knows Why.* Retrieved from New Republic: http://www.newrepublic.com/article/116993/millennials-are-abandoning-cars-bikes-carshare-will-it-stick

Ballaban, M. (2015, October 18). *Why Did Volkswagen Delete All Of Its Diesel Ads From YouTube?* Retrieved from Jalopnik: http://jalopnik.com/why-did-volkswagen-delete-all-of-its-diesel-ads-from-yo-1731691453

Bartolini, N. (2015). *The politics of vibrant matter: Consistency, containment and the concrete of Mussolini's bunker*. Journal of Material Culture, 191-210.

Bastian, A. B. (2015). *Peak car? Drivers of the recent decline in Swedish car use*. Centre for Transport Studies, 94-102.

Behrends, A. S. (2011). *Crude Domination*. New York: Berghahn Books.

Bennett, J. (2010). *Vibrant Matter*. London: Duke University Press.

Berger, M. (2001). *The Automobile in American History and Culture: A Reference Guide*. Westport: Greenwood Publishing Group.

Blanco, S. (2008, November 20). *LA 2008: Green Car of the Year is the Volkswagen Jetta TDI.* Retrieved from Auto Blog: http://www.autoblog.com/2008/11/20/la-2008-green-car-of-the-year/

Boston, W. (2015, October 5). *Volkswagen Emissions Investigation Zeroes In on Two Engineers*. Retrieved from Wall Street Journal: http://www.wsj.com/articles/vw-emissions-probe-zeroes-in-on-two-engineers-1444011602

Bowman, Z. (2013, July 24). *VW Passat TDI sets 77.9 mpg fuel economy record through Lower 48 states*. Retrieved from Auto Blog: http://www.autoblog.com/2013/06/24/vw-passat-tdi-sets-77-9-mpg-fuel-economy-record-through-lower-48/

Callon, M. (1981). *Struggles and Negotiations to Define what is Problemative and what is not: The Socio-logic of Translation*. In R. K. K. Knorr, The Social Process of Scientific Investigation. Dordecht, Holland: D. Reidel Publishing Co.

Callon, M. (2012 [1987]). *Society in the Making: The Study for Technology as a Tool for Sociological Analysis*. In W. E. Bijker, The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology (pp. 77-98). Cambridge: MIT Press.

Callon, M. B. (1981). *Unscrewing the Big Leviathan: How Actors Macro-Structure Reality and How Sociologists Help Them Do It.* In K. K.-C. (ed.), Advances in Social Theory and Methodology: Toward and Integration of Micro- and Macro-Sociologies. Boston: Routledge.

Cao, J. (2015, April 20). *Millennials Embrace Cars, Defying Predictions of Sales Implosion.* Retrieved from Bloomberg: http://www.bloomberg.com/news/articles/2015-04-20/millennials-embrace-cars-defying-predictions-of-sales-implosion

CBC News. (2015, October 16). *Volkswagen 'clean diesel' ads face U.S. probe*. Retrieved from CBC News: Business: http://www.cbc.ca/news/business/volkswagen-recall-wait-1.3274686

Cogan, R. (2015, Septemebr 30). *VW and Audi Returning Green Car Of The Year® Awards, Vehicles Deemed Ineligible.* Retrieved from PR Newswire: http://www.prnewswire.com/news-releases/vw-and-audi-returning-green-car-of-the-year-awards-vehicles-deemed-ineligible-300151534.html

Cole, C. (2015, April 28). *Millennials Like Cars, Dislike EVs: Survey*. Retrieved from Auto Guide: http://www.autoguide.com/auto-news/2015/04/millennials-like-cars-dislike-evs-survey.html

Dant, T. (2004). *The Driver-car*. Theory, Culture & Society, 61-79.

Dennis, K. a. (2009). *After the Car*. Cambridge: Polity Press.

Elfalan, J. (2010, May 17). *2009 Volkswagen Jetta TDI Wrap-Up*. Retrieved from Road and Track: http://www.roadandtrack.com/new-cars/road-tests/reviews/a15836/2009-volkswagen-jetta-tdi-wrap-up/

Elmer, S. (2015, November 25). *Millennials Show the Most Love for Their Cars: Study. Retrieved from Auto Guide*: http://www.autoguide.com/auto-news/2015/11/millennials-show-the-most-love-for-their-cars-study.html

Environment Canada. (2013). *Canada's Emissions Trends.* Environment Canada.

Ewing, J. (2015, October 4). *Volkswagen Engine-Rigging Scheme Said to Have Begun in 2008*. Retrieved from The New York Times: http://www.nytimes.com/2015/10/05/business/engine-shortfall-pushed-volkswagen-to-evade-emissions-testing.html?_r=0

Fisher, J. (2015, October 19). *Did Volkswagen Use 'Cheat Mode' as a Selling Point?* Retrieved from Consumer Reports: http://www.consumerreports.org/volkswagen/did-volkswagen-use-cheat-mode-as-a-selling-point/

Frankfurt, R. I. (2015, November 11). *VW diesel emissions investigation widened to include other brands*. Retrieved from The Guardian (UK Web Edition): http://www.theguardian.com/business/2015/nov/11/vw-emissions-investigation-widened-bmw-mercedes-ford

Gargett, D. (2012). *Traffic growth: Modelling a global phenomenon*. Canberra: Bureau of Infrastructure,Transport and Regional Economics.

George, P. (2014). *The 2015 Ford Mustang EcoBoost Fakes Its Engine Noise*. Jalopnik. Retrieved from: http://jalopnik.com/the-2015-ford-mustang-ecoboost-fakes-its-engine-noise-1638853878

Gilroy, p. (2001). *Driving While Black* in in D. Miller, Car Cultures. Berg. Oxford.

Glass Packaging Institute. (2014). *The Millenials: A Generation Invested in Health and Environment*. Glass Packaging Institute.

Glinton, S. (2015, September 24). *How A Little Lab In West Virginia Caught Volkswagen's Big Cheat*. Retrieved from npr.org: http://www.npr.org/2015/09/24/443053672/how-a-little-lab-in-west-virginia-caught-volkswagens-big-cheat

Goodwin, A. (2009, February 27). *2009 Volkswagen Jetta TDI review*. Retrieved from Road Show by CNET: http://www.cnet.com/roadshow/auto/2009-volkswagen-jetta-sedan/

Goodwin, P. (2012). *Peak Travel, Peak Car, and the Future of Mobility*. London: International Transport Forum.

Goodwin, P. a. (2013). *'Peak Car' — Themes and Issues*. Transport Reviews, 243-254.

Gordon-Bloomfield, N. (2011, September 26). *2012 Volkswagen Golf TDI Clean Diesel: 5 Things You Need To Know*. Retrieved from Green Car Reports: http://www.greencarreports.com/news/1066546_2012-volkswagen-golf-tdi-clean-diesel-5-things-you-need-to-know

Gramsci, A. (1971). *Americanism and Fordism*. In A. Gramsci, Selections from the Prison Notebooks (pp. 277-319). New York: Hoare and Smith.

Harper, B. (2011, August 10). *Car Review: 2009 Volkswagen Jetta TDI*. Retrieved from Driving.ca: http://driving.ca/volkswagen/jetta/reviews/road-test/road-test-2009-volkswagen-jetta-tdi-2

Harper, B. (2013, October 4). *Volkswagen goes on Canadian TDI Clean Diesel Tour*. Retrieved from Driving: http://driving.ca/volkswagen/auto-news/news/volkswagen-goes-on-canadian-tdi-clean-diesel-tour

Head, L. A. (2015, May 29). *My not-so-green millennial*. Retrieved from Green Biz: https://www.greenbiz.com/article/my-not-so-green-millennial?mkt_tok=3RkMMJWWfF9wsRohvqzJZKXonjHpfsX86%2BksX6C1lMI%2F0ER3fOvrPUfGjI4GTspgI%2BSLDwEYGJlv6SgFSLHEMa5qw7gMXRQ%3D

Headicar, P. (2013). *The Changing Spatial Distribution of the Population in England: Its Nature and Significance for 'Peak Car'*. Transport Reviews, 310-324.

Holtz, J. (1998). *Asphalt Nation*. University of California Press.

Ingold, T. (2010). *Bringing Things to Life: Creative Entanglements in a World of Materials*. Economic and Social Research Council: Working Papers.

Ingold, T. (2012). *Toward an Ecology of Materials*. Annual Reviews, 427-442.

Ingold, T. (2013). *Making: Anthropology, Archaeology, Art and Architecture*.

J.D. Power. (2015, September 29). J.D. Power-LMC reports: *Annual global diesel light-vehicle sales to reach 27 million by 2015.* Retrieved from PR Newswire: http://www.prnewswire.co.uk/news-releases/jd-power-lmc-reports-annual-global-diesel-light-vehicle-sales-to-reach-27-million-by-2015-154226015.html

Jackson, K. (1985). *Crabgrass Frontier*. London: Oxford University Press.

Khan, G. (2009). *Agency, Nature and Emergent Properties: An Interview with Jane Bennett*. Contemporary Political Theory, 90-105.

Kollewe, J. (2015a, October 1). *UK government wrong to subsidise diesel, says former minister*. Retrieved from The Guardian (UK Web Edition): http://www.theguardian.com/business/2015/oct/01/uk-government-wrong-to-subsidise-diesel-says-former-minister

Kollewe, J. (2015b, December 10). *Volkswagen emissions scandal – timeline*. Retrieved from The Guardian (UK Web Edition): http://www.theguardian.com/business/2015/dec/10/volkswagen-emissions-scandal-timeline-events

Kong, B. (2013, October 28). *Chevrolet Cruze 2.0TD vs. Honda Civic Hybrid vs. Toyota Prius vs. Volkswagen Jetta Hybrid vs. Volkswagen Jetta TDI.* Retrieved from Motor Trend: http://www.motortrend.com/news/the-big-test-2013-2014-hybrid-and-diesel-sedan-comparison/

Kuhnimhof, T. A. (2012). *Men shape a downward trend in car use amongst young adults — Evidence from six industrialised countries*. Transport Reviews, 761-779.

Kuhnimhof, T. D. (2013). *Who Are the Drivers of Peak Car Use?* Transportation Research Record: Journal of the Transportation Research Board, 53–61.

Lam, B. (2015, September 15). *The Academic Paper That Broke the Volkswagen Scandal*. Retrieved from The Atlantic: http://www.theatlantic.com/business/archive/2015/09/volkswagen-scandal-cheating-emission-virginia-epa/407425/

Latour, B. (1986). *The Powers of Association*. In J. Law: Power, Action, and Belief: A New Sociology of Knowledge (pp. 264-280). London: Routledge.

Latour, B. (1987). *Science in Action: How to Follow Scientists and Engineers Through Society*. Cambridge: Harvard University Press.

Latour, B. (1993). *We Have Never Been Modern*. London: Harvard University.

Latour, B. (1996). *On Actor-Network Theory: A Few Clarifications*. Sozial Welt, 369-381.

Latour, B. (2005). *Reassembling the Social: An Introduction to Actor-Network-Theory*. London: Oxford University.

Law, J. M. (1988). *Engineering and Sociology in a Military Aircraft Project: A Network Analysis of Technological Change*. Social Problems, 284-297.

Le Vine, S. (2012). *On the move: Making sense of car and train travel trends in Britain*. London: RAC Foundation.

Lutz, H. (2015, April 27). *Asia-Pacific grabs bigger share of 2014 global vehicle output*. Retrieved from Automotive News: http://www.autonews.com/article/20150407/OEM01/150409881/asia-pacific-grabs-bigger-share-of-2014-global-vehicle-output

Martin, G. (2015). *Automobility and social ecological sustainability*. In A. Walks, The Urban Political Economy and Ecology of Automobility (pp. 23-37). New York: Routledge.

Marx, K. ([1843] 1978). *On the Jewish Question*. In R. T. ed., Marx-Engels Reader. New York: W.W. Norton.

Marx, K. ([1844] 1874). *Economic and Philosophical Manuscripts*. In K. a. Marx, Marx's Early Writings (pp. 279-400). London: Penguin Books.

Marx, K. ([1852] 1977). *The Eighteenth Brumaire of Louis Bonaparte*. Moscow: Progress.

Marx, K. ([1870] 1970). *The Civil War in France*. Peking: Foreign Languages Press.

Marx, K. (1857). *Pre-Capitalist Economic Formations*. New York: International Publishers.

Marx, K. (1859). *A Contribution to the Critique of Political Economy* (Online Version, 1993 ed.). Moscow: Progress Publishers.

Marx, K. a. ([1845] 1947). *The German Ideology*. New York: International Publishers.

Marx, K. E. (1988). *The Manifesto of the Communist Party*. New York: Norton.

Mays, K. (2014, November 3). *Study: Just One-Third of Hybrids Save Money Versus Non-Hybrid Counterparts*. Retrieved from Cars.com: https://www.cars.com/articles/2014/11/study-just-one-third-of-hybrids-save-money-versus-non-hybrid-counterparts/

Mays, K. (2015a, December 10). *Volkswagen: Emissions Software Not a One-Time Mistake*. Retrieved from Cars.com: https://www.cars.com/articles/volkswagen-emissions-software-not-a-one-time-mistake-1420682917738/

Mays, K. (2015b, September 23). *VW Diesel Crisis: Timeline of Events*. Retrieved from Cars.com: https://www.cars.com/articles/vw-diesel-crisis-timeline-of-events-1420681251993/

Mays, K. (2015c, October 8). *VW: Diesel Owners Should Get EPA Mileage After Fix*. Retrieved from Cars.com: https://www.cars.com/articles/vw-diesel-owners-should-get-epa-mileage-after-fix-1420681342830/

Metz, D. (2013). *Peak Car and Beyond: The Fourth Era of Travel*. Transport Reviews, 255-270.

Miller, D. (1987). *Culture and Mass Consumption*. Oxford: Basil Blackwell Ltd.

Miller, D. (2001). *Car Cultures*. New York: Berg.

Miller, D. (2008). *The Comfort of Things*. Cambridge: Polity Press.

Miller, D. a. (2011). *Global Denim*. New York: Berg.

Miller, D. (Editor) (1998). *Material Cultures*. Chicago: University of Chicago Press.

Miller, D. (Editor) (2005). *Materiality*. London: Duke University Press.

Mintz, S. W. (1986). *Sweetness and Power: The Place of Sugar in Modern History*. New York: Penguin Books.

Morgan Stanley. (2015, February 27). *Sustainability Through the Eye of the Investor*. Retrieved from Institute for Sustainable Investments: http://www.morganstanley.com/ms-articles/sustainability-in-the-eye-of-the-investor/index.html

Morrison, K. (2006). *Marx, Durkheim, Weber: Formations of Modern Social Thought*. London: Sage Publications.

National Highway Traffic Safety Administration. (2015, December 16). *Corporate Average Fuel Economy (CAFE)*. Retrieved from NHTSA: CAFE - Fuel Economy: http://www.nhtsa.gov/fuel-economy

Norman, D. (2002). *The Design of Everyday Things* (Web Edition). New York: Basic Books. Retrieved November 2015, from http://proquest.safaribooksonline.com.proxy.library.carleton.ca/book/design/9780465072996/1-the-psychopathology-of-everyday-things/sec1_html?uicode=Carleton

O'Dell, N. (2012). *Here's Why Real-World MPG Doesn't Match EPA Ratings*. Edmunds. Retrieved from: http://www.edmunds.com/fuel-economy/heres-why-real-world-mpg-doesnt-match-epa-ratings.html

Paterson, M. (2007). *Automobile Politics*. Cambridge: University of Cambridge Press.

Pew Research Center. (2011, November 3). *Section 8: Domestic and Foreign Policy Views.* Retrieved from Pew Research Center: US Politics and Policy: http://www.people-press.org/2011/11/03/section-8-domestic-and-foreign-policy-views/

Pauwellusson, J. (1999). *Vehicle Performance.* CRC Press.

Powers, L. (2016, February 15). *CIAS 2016: Toronto auto show packed with cars for 'mainstream' millennials.* Retrieved from CBC News Business: http://www.cbc.ca/news/business/toronto-auto-show-millennials-1.3446370

Press, T. C. (2015, January 5). *Canadian auto sales set new annual record*. Retrieved from Global News: http://globalnews.ca/news/1755283/canadian-auto-sales-set-new-annual-record/

Prodhan, J. E. (2016, January 6). *VW faces billions in fines as U.S. sues for environmental violations*. Retrieved from Reuters: http://www.reuters.com/article/us-volkswagen-usa-idUSKBN0UI1QP20160106

Puzzanghera, J. J. (2015, October 8). *VW exec blames 'a couple of' rogue engineers for emissions scandal.* Retrieved from Los Angeles Times: http://www.latimes.com/business/autos/la-fi-hy-vw-hearing-20151009-story.html

Pyper, J. (2012, April 24). *Diesel Cars Make a Comeback in the U.S.* Retrieved from Scientific American: http://www.scientificamerican.com/article/diesel-cars-make-a-comeback-in-the-us/

Quiroga, T. (2010, February). *2009 Volkswagen Jetta TDI Diesel*. Retrieved from Car and Driver: http://www.caranddriver.com/reviews/2009-volkswagen-jetta-tdi-diesel-long-term-road-test

Ramey, J. (2013, July 7). *Volkswagen Passat TDI Clean Diesel sets fuel economy record*. Retrieved from Auto Week: http://autoweek.com/article/car-news/volkswagen-passat-tdi-clean-diesel-sets-fuel-economy-record

Reuters, T. (2015, September 22). *Volkswagen Sheds Over $15 Billion in Market Cap as Shares Crash 20%.* Retrieved from NDTV Profit: http://profit.ndtv.com/news/international-business/article-volkswagen-sheds-over-15-billion-in-market-cap-as-shares-crash-20-1220225

Robinson, A. (2015, November 3). *Caught Black-Handed: Why Did Volkswagen Cheat?* Retrieved from Car and Driver: http://blog.caranddriver.com/caught-black-handed-why-did-volkswagen-cheat/

Roth, D. (2016, October 16). *The tumultuous history of the diesel engine.* Retrieved from Auto Blog: http://www.autoblog.com/2015/10/06/diesel-engine-history-feature/

Ruddick, G. (2015, September 26). *Volkswagen emissions scandal: Switzerland bans sale of some models.* Retrieved from The Guardian (UK Web Edition): http://www.theguardian.com/business/2015/sep/26/volkswagen-emissions-scandal-switzerland-bans-sale-of-some-models

Ruddick, G. (2015, November 4). *VW admission suggests cheats went much further than emissions.* Retrieved from The Guardian (UK Web Edition): http://www.theguardian.com/business/2015/nov/03/vw-c02-emmission-problems-800000-vehicles

Ruddick, G. (2015, December 9). *VW says CO2 emissions irregularities affect fewer cars than feared.* Retrieved from Guardian (UK Web Edition): http://www.theguardian.com/business/2015/dec/09/vw-says-co2-emissions-irregularities-affect-fewer-cars-than-feared

Scarpa, S. (2008). *Trafficking in Human Beings*. New York: Oxford.

Sivak, D. S. (2012). *Recent Changes in the Age Composition of Drivers in 15 Countries*. Traffic Injury Prevention, 128-132.

Sivak, M. S. (2013). *The Reasons for the Recent Decline in Young Driver Licensing in the United States.* Traffic Injury Prevention, 6-9.

Tencer, D. (2011, August 8). *Number Of Cars Worldwide Surpasses 1 Billion; Can The World Handle This Many Wheels?* Retrieved from Huffington Post: http://www.huffingtonpost.ca/2011/08/23/car-population_n_934291.html

Thompson, D. J. (2012, September). *The Cheapest Generation*. Retrieved from The Atlantic: http://www.theatlantic.com/magazine/archive/2012/09/the-cheapest-generation/309060/

Timm, J. (2014, March 22). *Millennials: We care more about the environment*. Retrieved from MSNBC: http://www.msnbc.com/morning-joe/millennials-environment-climate-change

Topham, G. (2015, September 24). *VW scandal: outgoing boss's €28m pension pot to pay out €1m a year.* Retrieved from The Guardian (UK Web Edition): http://www.theguardian.com/business/2015/sep/24/vw-emissions-scandal-boss-martin-winterkorn-pension-pot

Tuttle, B. (2013, August 9). *The Great Debate: Do Millennials Really Want Cars, or Not?* Retrieved from Time - Web Edition: http://business.time.com/2013/08/09/the-great-debate-do-millennials-really-want-cars-or-not/

Urry, A. E. (2010). *Mobile Lives*. New York: Routledge.

Urry, J. (2004). *Systems of Automobility*. Theory, Culture & Society, 25-39.

Vaidyanathan, G. (2009, October 9). *Volkswagen: Our Diesel Cars Whup The Prius And Other Hybrids.* Retrieved from Business Insider: http://www.businessinsider.com/volkswagen-preps-for-a-diesel-revolution-2009-10

Voelckler, J. (2014, July 29). *1.2 Billion Vehicles On World's Roads Now, 2 Billion By 2035: Report.* Retrieved from Green Car Reports: http://www.greencarreports.com/news/1093560_1-2-billion-vehicles-on-worlds-roads-now-2-billion-by-2035-report

Voelckler, J. (2015, September 26). *Why Did Volkswagen Cheat On Diesel Emissions In Its TDI Cars?* Retrieved from Green Car Reports: http://www.greencarreports.com/news/1100225_why-did-volkswagen-cheat-on-diesel-emissions-in-its-tdi-cars

Volkswagen AG. (2015, April 10). *VW - OLD WIVES TALES ABOUT DIESEL - MICHAEL VW*. Retrieved from YouTube: https://www.youtube.com/watch?v=yl8B7bviTZU

Volkswagen AG. (2016). *TDI*. Retrieved from Volkswagen.co.uk: http://www.volkswagen.co.uk/technology/diesel/tdi

Walker, J. (2010, February 17). *Verdict: 2009 Volkswagen Jetta TDI*. Retrieved from Motor Trend: http://www.motortrend.com/news/2009-volkswagen-jetta-tdi-verdict/

Walks, A. (2015). *Driving Cities*. In A. W. (Ed.), The Urban Political Economy and Ecology of Automobility (pp. 3-20). New York: Routledge.

Walks, A. (2015). *Driving the Vote*. In A. W. (Ed.), The Urban Political Economy and Ecology of Automobility (pp. 199-220). New York: Routledge.

Welch, D. M. (2014, August 2015). *Millennials Join Confident Consumers Snapping Up Autos in U.S.* Retrieved from Bloomberg: http://www.bloomberg.com/news/articles/2015-08-03/millennials-join-confident-consumers-snapping-up-autos-in-u-s-

Wells, C. W. (2012). *Car Country: An Environmental History*. Washington: University of Washington Press.

Wendler, A. (2015, September 21). *How Volkswagen Got Busted for Skirting EPA Diesel Emissions Standards.* Retrieved from Car and Driver: http://blog.caranddriver.com/how-volkswagen-got-busted-for-gaming-epa-diesel-emissions-standards/

Young, A. (2015, September 23). *Volkswagen scandal linked to investigation by California Air Resources Board.* Retrieved from Sacramento Business Journal: http://www.bizjournals.com/sacramento/news/2015/09/23/volkswagen-scandal-linked-to-investigation-by.html

Young, D. (2001). *The Life and Death of Cars: Private Vehicles on the Pitjanjatjara Lands, South Australia* in D. Miller, Car Cultures. Berg. Oxford.

Zhang, B. (2015, October 7). *This is the real cause of the Volkswagen cheating scandal.* Retrieved from Business Insider: http://www.businessinsider.com/this-is-the-real-cause-of-the-vw-cheating-scandal-2015-10