The Driver-Car

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Abstract

The car has become ubiquitous in late modern society and has become the leading object in the ordinary social relations of mobility. Despite its centrality to the culture and material form of modern societies, the relationship between the car and human beings has remained largely unexplored by sociology. This paper argues that cars are combined with their drivers into an assemblage, the 'driver-car', that has become a form of social being that brings about distinctive social actions in modern society - driving, transporting, parking, consuming, polluting, killing, communicating and so on. To understand the nature of this assemblage a number of theoretical perspectives that describe the interaction and collaboration between human beings and complex objects are explored; the process of driving, 'affordance', actor-network theory, and the embodied relationship between driver and car. This theoretical account of the driver-car is intended as a preliminary to the empirical investigation of the place of the driver-car in modern societies.

Introduction

The motor car has become ubiquitous in late modern societies, including the United Kingdom where 70% of the population hold driving licences and there are nearly 23 million licensed cars. Whereas in 1960 the majority of households (71%) did not have the regular use of a car, by 1999 the majority (72%) did (DETR 2000). As long ago as 1963, Roland Barthes (1993: 1136) pointed out that the car had become a 'need' not a luxury and in 1968 Henri Lefebvre (1971: 100) called it the 'Leading-Object' in terms of its centrality within the culture of modern societies. The car shapes the built environment, cuts through the landscape, dominates the soundscape, is a key commodity in production and consumption. Despite this prominence the car, unlike for example the impact of information technology, has largely been ignored by sociology as a component of social being and social action in late modernity (Hawkins 1986; Dant and Martin 2001; Miller 2001a).

The car has been considered from two key perspectives in the social sciences, firstly as a commodity that exemplifies the development of production in industrial capitalism[1] and secondly as a commodity that exemplifies the desired object which motivates consumers in late capitalism.[2] Recently the issue of mobility has begun to direct attention to the car (Urry 2000) and a number of features of car culture have begun to be explored (e.g. Miller 2001b). What is surprising, however, is that the car has not attracted much more than cursory commentary as an object that actually shapes the form and content of social action (although see Elias 1995). More often than not, the car and motor traffic is used as a taken-for-granted analogy to explain other social actions such as those of pedestrian traffic (e.g. Goffman 1971). But the way that the car has introduced new forms of social action in late modernity, thereby contributing to its distinctive nature, has not yet been the focus of serious sociological attention. This paper explores the 'assemblage'[3] of the driver-car as a form of social being that produces a range of social actions that are associated with the car; driving,

transporting, parking, consuming, polluting, killing, communicating and so on. The form of social being that results from the collaboration of human and machine has attracted the term ‘cyborg’ (Haraway 1991; Bukatman 1993; Featherstone and Burrows 1995) but as I have argued before (Dant 1999: 191-194) the term ‘cyborg’ properly refers to the feedback systems incorporated into the body that can be used to replace or enhance human body parts. Tim Luke develops Haraway's (1996) 'ironic political myth' of the cyborg to comment on the cultural and economic 'dehumanization' of the car driver's subjectivity as she or he becomes merged with a car to create a new cyborg life form, the 'car-and-driver' (1996: 17-19) but the idea of the cyborg tends to fix and reify the assemblage. While the car can be seen as a mobility aid for the able-bodied, human subjectivity is in no sense constituted by getting into a car; it is a temporary assemblage within which the human remains complete in his or herself. For the same reason it is unhelpful to think of the driver-car assemblage as a ‘hybrid’, a term used by actor-network theory (Callon 1991:139) and by others (Rosen 1995, 2002; Dant 1998; Urry 1999) to refer to the collaboration of human and object forms. The word hybrid refers to the offspring of two species that are usually unable to reproduce whereas the driver-car is an assemblage that comes apart when the driver leaves the vehicle and which can be endlessly reformed, or re-assembled given the availability of the component cars and drivers. The term ‘hybrid’ is used more strictly (e.g. by Latour 1996:150) to refer to entities that result from permanently combining similar types of object – car commentators of course use the term in this way to refer to models that combine two types such as the sports/utility vehicle.

The driver-car is not a species resulting from chance mating but a product of human design, manufacture and choice. The particular driver-car may be assembled from different components with consequent variations in ways of acting and its modal form may vary over time and place. However, despite variations, the assemblage of the

driver-car enables a form of social action that has become routine and habitual, affecting many aspects of late modern society. The aim of this paper is to begin to develop a theoretical understanding of the way in which the assemblage is formed. Neither the human driver or the car acting apart could bring about the types of action that the assemblage can; it is the particular ways in which their capacities are brought together that bring about the impact of the automobile on modern societies.

In this article I will explore a number of ways in which the assemblage of the driver-car can be understood to begin to build an account of the relationship between its components. Here the argument is theoretical and tentative but it is intended that it will provide the basis for empirical sociological investigation of the driver-car and begin to develop ways of understanding other human / object assemblages. What is at stake is whether social life is simply the result of relationships between human beings forming into social groups or whether collaborations between human beings and material objects contribute to the formation of societies and give them particular characteristics and features.

The driver-car's affordances

In an article originally published in 1938 the ecological psychologist James J. Gibson attempted to understand the process of driving a car. He developed a concept of the 'field of safe travel':

> It consists, at any given moment, of the field of possible paths which the car may take unimpeded. Phenomenally it is a sort of tongue protruding forward along the road. Its boundaries are chiefly determined by objects or features of the terrain with a negative 'valence' in perception - in other words obstacles.
>
> (Gibson 1982a:120 - emphasis in original)

Gibson was concerned with how the driver's perception of the road enabled her or him to undertake the action of driving. The 'field of safe travel' is a psychologist's construct of what is presumed to be present in perception to the successful driver. There is in this approach to the relationship between the driver and the car a clear distinction between the object, which Gibson treats as a 'locomotion tool', and the driver who is treated as being the agent of any ensuing action. The 'tongue' metaphor, which suggests some bio-mechanical beast, is rather difficult to grasp from the perspective of a driver but makes sense as a description of how the field is shown in the figures in Gibson's article. These are plan drawings of road situations that show the orientation of cars to each other - a view that no driver ever has but one that is reminiscent of the view from a police helicopter or that of a child playing with model cars. For some of the cars in the figures a 'tongue' shape has been drawn projecting in front of the vehicle to indicate the 'field' in which the driver might expect to drive and have some sight of. The edges of the field are curved around obstacles and its furthest edge is also curved. Within the field is the 'minimum stopping zone' indicating the point at which the driver knows she or he could stop the vehicle. If the field is characterised by a positive valence - the driver feels able to drive into it - obstacles have a negative valence that Gibson calls a 'halo of avoidance' that can be represented in the figures by 'lines of clearance' (Gibson 1982a: 127). These indicate how a driver would attempt to maintain a safe distance; the closer their vehicle gets to the obstacle, the stronger the negative valence.

The plan view provides a disembodied, unengaged, godlike perspective on the array of objects - it is an object-ive perspective that separates the car as object from the subjectivity of the driver. However, Gibson's discussion of the perceptual engagement of the driver does make some sense. For example, the novice car driver has to learn to 'anticipate the road' by extending her visual attention by hundreds of feet to cover a 'field' in which potential obstructions - the parked car, the child running

towards the kerb - are noticed. Within this visual field the driver is more continually attentive than to events happening behind or to the side of the car. Events to the sides of the vehicle where it could not possibly be directed are not usually registered at all. The limited field of action of the motor car - which cannot move sideways - is overlooked by Gibson because his focus is on the perceiving subject, the driver.

This early account of the process of driving treats the driver as somehow independent of the car and it's context. 'Driving' is treated as something that the human being inside the car does to the car, on the road. The process is treated as predominantly psychological so that the car is considered simply as a tool that is known and predictable. The 'skilled driver' is also taken for granted as are the sorts of activities and situations that driving involves; in fact cars, drivers, driving actions and driving situations are all variable and change over time and from place to place.

There are two points in Gibson's account at which the centrality of the psychological process of driving is accepted as not the complete story. Firstly, he recognises that the complexity of the process he is describing is way beyond conscious cognitive capacity. As he points out, 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 car, the oncoming car) and their continually changing fields of safe travel in relation to the stationary road. What is involved is a processing of information that Gibson remarks is ‘astounding’ (1982a: 130 fn10). Secondly, while through most of the discussion the car is simply taken for granted as a 'tool of locomotion', he does in one section recognise that the car itself is:

> … also 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 1982a: 134)

This begins to suggest an embodied relationship between the driver and the car but Gibson's interest in the driver was focussed; he wanted to be able to contribute as a scientist to the debate about what skills drivers needed and to help reduce the number of deaths on the road.

James Gibson is rather more famous for his later work in ecological psychology that produced the concept of 'affordance' as a way of grasping how animals, including human beings, relate to their material environment. The notion of affordance is a development of 'valence' that points to the way that the materiality of an animal 'fits in' with some material aspect of its environment; Gibson writes of the 'complementarity of the animal and environment' (1979: 127). An object does not have affordance as a general property (such as its weight or chemical composition) but affords particular things to the materiality of particular species. An armchair affords a bed to my cat but affords a seat to me; the cat's size and arrangement of limbs means that it can curl up and sleep soundly on the soft surface. The chair is too small for me to curl up in - indeed humans do not curl up quite as cats do - but does provide support for my bottom, back and arms, which is one of the ways that humans take the weight off their legs and 'sit'. Affordance is then a relational (Mannheim 1936: 254) concept rather than an absolute one and can be seen as a different expression of Mead's conception of the physical objects in a field inviting human beings to take up an attitude to them. Mead writes of objects such as the armchair 'calling out' to the human being to sit in them (Mead 1962: 278-280 - see McCarthy 1984 and Dant 1999: 120-123). Indeed, Gibson suggests that the origin of the concept of affordance lies in Kurt Lewin's term *Aufforderunscharakter* which was

translated by J. F. Brown as the 'invitation character' of an object (Gibson 1979: 138; Marrow 1969: 56).

The motor car affords the human being locomotion and mobility and it affords the driver motility (the capacity to move spontaneously and independently). The combination of mobility and motility that the car offers the driver is akin to that offered by her or his legs except that it requires little effort, is much faster and can cover much greater distances. The affordance of the motor car can be seen as a progression from that of the horse as a means of transport for its rider, although the horse affords mobility over rough terrain, whereas the car only affords it over fairly smooth surfaces. The motor car affords mobility in a forward or backwards direction; unlike horses and helicopters it cannot afford sideways movement. As well as extending the motility of the driver/rider, the car, like the horse, also has negative affordances. The horse consumes oats, the car petrol, the horse produces manure, the car fumes, both take up more space than the human body, require periodic attention and somewhere to rest when not in use. The horse, especially in a team or with a carriage, is, like the car, heavy and dangerous to other animals and objects in its path.

The strength of the concept of affordance is that it establishes the properties of material things in relation to a particular species. It treats the world of objects and material forms as connected in ways that are enabled or constrained by their physical properties - in this sense, it seems to ground the relation in a 'real' world, prior to any human interpretation or construction of it. For Ian Hutchby (2001), the concept of affordance is preferable to the textual metaphor so often employed in social construction of technology writing, because it allows for a realist, physical relation. As Gibson himself put it:

> The affordance of something does not change as the need of the observer changes… The object does what it does because it is what it is.
>
> (Gibson 1979: 139)

Horses and cars do not afford flying because, unlike birds and aeroplanes, they do not have the physical capacity to move without a fixed surface beneath them. Hutchby wants to incorporate the way particular objects constrain or enable particular courses of human action into sociological accounts, rather than reducing such interaction with objects to the accounts of what can be done with them (Hutchby 2001: 450). The concept of affordance entails the real, physical resistance of material objects to infinite variations in use by humans whereas textual metaphors open up a potentially limitless range of possibilities.

But the realism that the concept of affordance implies is of course itself an interpretation. Affordance is a post-hoc identification of possible uses by a given animal; we know what an object affords because we know what it can be used for. One of the major distinctions between human beings and other species is their capacity for discovering the affordances of objects. This includes of course adapting, modifying and designing the material world to create affordances - this is one of the reasons why we come to have motor cars and other animals do not. Other species do do some of this discovering of affordance - as in chimps' use of grasses to extract termites from a hole - but human beings interfere with the materiality of the world to shape it to their imaginations and their bodies. Gibson refers to this emergent quality of affordances as being specified in perception, in ‘stimulus information’ (1979: 140). But the problem that Hutchby sees as solved by affordance is of course circular; how we know that a particular object is offering a particular affordance depends on what we know of that object. And what we know is as likely to be based on textual experience as direct experience. So, I can know that my MGB is likely to break away

or skid at the back at a certain speed, not because I have felt it or seen it happen but because I have read it or been told it - it is 'common knowledge' amongst MGB drivers, even those who have learnt to drive on cars with more modern and forgiving suspension systems, shared through conversations with other MGB owners.[4] My visual perception is not a complete story; it merely suggests possibilities about which I already know. My knowledge does not derive simply from the stimulus in perception, as Gibson would have us believe, because humans pass on knowledge in different ways from other animals.

Gibson's concept of affordance draws us into the complex collaboration of a human and object assemblage such as the driver-car and it goes some way towards rebutting a mind / body dualism by situating the coordinates of physical action in the material world and resisting a separate, cognitive, phase in which action is planned or programmed. Even so, it leans too heavily in favour of the perceiving human as the source of agency, in particular by treating designed artefacts as essentially the same as natural objects. The presence of a chair in a room is not coincidental in the same way that a rock convenient for sitting on might be. Chairs are designed, made and placed by human beings following cultural patterns that are learnt and reinforced discursively. That a particular chair is intended for a particular person or type of person may be designed into the chair (Dant 1999: 79-81) or it may only become apparent by what one is told by someone else. So human beings not only design objects to afford but also design human beings to afford; school children are taught to respect the teacher's chair and not to sit in it. The object can also be designed to embody social relations of power - to make the user act in certain ways.[5] The teacher's chair can be designed to be distinct from an ordinary chair so that the pupils are in no confusion about its being just any chair that might afford them sitting (in my primary school, the seat of the teacher's chair was higher than ordinary, with a foot ledge, so the teacher could survey the class while sitting).

Alan Costall has tried to repair the concept of affordance by 'socialising' it (1995). He begins by pointing to the extent of human intervention in the material world that has not only designed in affordance but has also specified it, giving objects functions and meanings. He makes the point that human beings learn affordances from each other and that they police each other's uses of objects such that there is a 'morality of things' (Costall 1995: 473). In a later article Costall attempts to protect the concept of affordance from becoming too bound up in particular actions or uses with the term 'canonical affordance':

> A chair, for example, is for sitting on, even though it may be used in many other ways, e.g. as firewood or for standing upon. *The* meaning of a chair is defined by its name, sustained and revealed within certain practices and realized in its very construction. It is *meant* to be a chair.
>
> (Costall 1997: 79 - emphasis in original)

The emphasis in his assertion is not, however, sufficient to establish a cannon, certainly not one that my cat is going respect when she curls up in my chair. The policing of teacher's chairs and academics armchairs is achieved not simply by any affordance but by the use of the sharp word and the firm hand.

Costall is trying to make the concept of affordance do more work than it can. Of course unlike material objects, the meanings of words can afford just about anything given sufficient translation, but the notion of affordance itself does not tell us anything about the rather more interesting social relations with objects that Costall brings out; designing, making, adapting, learning to use, maintaining, policing and so on. 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 is 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

The driver-car network

A more complex account of the relationship between human beings and objects that redistributes agency between human beings and objects, is that of Actor Network Theory (ANT) associated with the writing of Latour, Callon, Akrich, Law and others. ANT can be understood as a reaction to the sociologism of social studies of technology (SST) that had begun to focus on the social construction of the material world of bakelite, bikes, bridges and fridges (see e.g. Mackenzie and Wacjman 1985; Bijker, Hughes and Pinch 1987). Rather than the technical world being revealed, discovered or invented by individuals and subsequently shaping the social world, the social construction of technology (SCOT) perspective demonstrated that technological innovation was frequently shaped by particular social conditions. The SCOT approach emphasised the significance of a range of social actors - entrepreneurs, businesses, advertisers, investors, government departments, consumers - as all contributing to the shaping of technological development. ANT supplemented this approach in three principle ways. Firstly, it identified the social relations involved in technological development as networks - the various actors establish reciprocal relationships of interest and power which affect how technological development proceeds. Some local networks might be presented and represented as if they constituted a single actor in other, more global networks (Law and Callon 1992). Secondly, ANT emphasised the linguistic or semiotic work of networks in achieving technological development by pointing to the activities of inscription, description (Akrich 1992), translation (Callon 1986a) and so on. Thirdly, and for my purposes most importantly, ANT treated material objects as actors in actor networks. These 'actants' (Akrich) or 'nonhumans' (Latour) included living organisms (microbes – Latour 1988, scallops - Callon 1986b) as well as physical

objects (electric cars - Callon 1986a; transit systems - Latour 1996; lighting systems - Akrich 1992, aircraft - Law and Callon 1992).

In the tradition of SST and SCOT, ANT not only enjoys an acronym, it also focuses on technological projects - usually failed attempts to create new systems! All three approaches treat material things as historically emergent and the sociological account of the technology details social actions - often discursive - that take place in an historical sequence which is presented not as causal but as a changing context in which previous events and interventions do affect future ones. The approach is then developmental or evolutionary; reverse engineering the sequence of social circumstances to reveal the contingencies that led to a final state in the network. This micro history (of a project or a technology rather than a society) reveals the social character of changes in the material world and ANT adds to this the material character of the physical components in the network. For example in Michel Callon's account of the attempt to develop an electric car in 1970s France, in addition to consumers, companies and ministries there are also '… accumulators, fuel cells, electrodes, electrons, catalysts and electrolytes' (1986a: 22). These material components both contribute to the work of the network and can resist development just as much as social components such as organisations and cash flow.

The actor network is a set of links between heterogeneous elements that are durable, either because of human interests or physical properties, but that can be modified or break down. To lift this way of thinking of actor networks from the development of a new technology to a routine experience such driving a petrol-engined car works remarkably well. The mobility of the driver-car is dependent on the network of the car's components and the human driver's capacities; there must be sufficient cash flow to provide the petrol, there must be petrol available in petrol pumps nearby, the driver must be able to get the petrol into the car and the engine must be in sufficiently

good condition for the petrol to be ignited and for combustion to be translated into movement of the driver-car.

There is a network of driver, petrol company, petrol and car to which the humans and non-humans must be contributing if the driver-car is to achieve mobility. But without much investigation it is obvious that there are all sorts of other networks entailed in this basic driver / petrol / company / car network. So, 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. And at the social level there must be no fuel protestors blocking deliveries to petrol 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. ANT has a way of dealing with the potentially infinite proliferation of actors and networks; it 'black-boxes' networks that appear or are presented as a single entity within a particular network (Callon et. al.1986: xvi; Latour 1999: 304). So the workings of the car and the process of the petrol industry are black-boxed in the routine of the filling up with petrol and driving off. These networks are only attended to by the driver-car when something goes wrong; when there is no petrol to be bought, when prices change, when the car won't start, when the performance of the car is poor.

The concept of affordance does not offer any account of the dynamics of relations between humans and objects; it overlooks the fact that they change over time and according to social context. This temporal and variable dimension is provided by actor network theory in which the relationship between human and object is seen to evolve and to bring about changes in the possibility of social action. But actor network theory treats the relationship between humans and objects as always mediated through some form of language. In some cases this is the text of a report by an engineer or a publicity statement, at other times it is the speech of a key

human actor who describes the actions of various actors in the network - including the non-human ones. But very often the textual gloss is created by the actor network theorist and it is articulated with an irony and playfulness that distances the reader from the activities and operations of the material objects. Even more striking is the general absence of any attempt to explore how the human and the non-human actors interact. There is no reference to video or observational data[6], no account of how things work or how people use them, but there are plenty of concepts, diagrams and allusive summarising comments. The only social action reported for all the actors in the network, human and non-human, is communicative. For ANT this is always treated as a process of 'translation'; human actors 'delegate' tasks to technical objects and the objects operate as 'scripts' that regulate human action or act as 'intermediaries' linking nodes in the network. ANT expands on the social and historical character of affordances but tells us little about the lived nature of human beings and objects.

One of Latour's examples of the merging of humans and non-humans derives from the debate over whether guns kill people or whether it is the people with the guns who kill: ‘Which of them, then, the gun or the citizen, is the *actor* in this situation? *Someone else* (a citizen-gun, a gun-citizen)’ (1999: 179 – emphasis in original). As Latour points out the human agent is transformed by the possession of the gun, but the gun is also transformed by being in the hand of someone willing to use it. The programme of action of both subject and object is transformed once they come together - combined they may act towards a quite different goal than either could have achieved independently. It is in this sense that the assemblage of the driver-car brings about a form of social being and a set of social actions that is different from other forms of being and action. But a problem with actor network theory and Latour's various theorisations, is that the difference between humans and non-humans is left unclarified. For example with the citizen-gun Latour asserts:

> Purposeful action and intentionality may not be properties of objects, but they are not properties of humans either. They are properties of institutions, of apparatuses, of what Foucault called dispositifs. Only corporate bodies are able to absorb the proliferation of mediators, to regulate their expression, to redistribute skills, to force boxes to blacken and close… Boeing 747s do not fly, airlines fly.
>
> (Latour 1999: 192-3)

This is a strange formulation for a number of reasons. Firstly, it is unclear what birds are doing when they fly, or the individual owner/pilot - it is not a requirement of flying (or car-driving) that there be an institution or corporate body. Having a gun licence, a pilot's licence or a driving licence indicates a *dispositif* that sanctions certain actions but does not, for example, initiate it or direct them. Secondly, the human is, like the bird, itself an object - it is embodied. This means that it acts as an entity in itself - it is corporate in itself, has 'non-human' properties as well as 'human' ones. Thirdly, the disposition to act does not need to be reduced to a single mental act, a motivation for example, for it to be attributed to a person; a body that exercises intentions. Fourthly, Latour is threatening the possibility of free will, of intentionality and the operation of choice, which is normally taken to reside in human beings but not in objects.

The car itself may 'act' (by going slowly or pulling to the left) but we do not attribute this to the intention or choice of the car (or the engine, or the steering). Of course, some non-humans do have a measure of intentionality and the riders of horses will attribute the slowness of the horse to its intentionality (reluctance to ride away from food and home, keeness to ride towards food and home…).[7] But objects that are lifeless, especially artificial objects like cars, do not have any intentionality of their own. However, one of the features of artificial objects is that they are made by people who do have intentions. These intentions are designed and made into the object. In this sense, all non-humans become imbued with human intentionality; guns are

intended for killing, cars for driving. Horses, once trained, fed and saddled, become non-humans that have taken on some human intentionality for riding. One of Latour's favourite examples is the 'sleeping policeman' or speed bump, an object which polices the use of cars (1992: 244; 1999: 188)[8] by clearly interrupting the normally smooth surface of the road causing the car to bounce if it is driven over the bump too fast. For Latour the 'actant' of the speed bump 'slows down cars or damages them' (1999:188); it works as a 'delegation' because it 'stands in for an actor and creates an asymmetry between absent makers and occasional users' (1999: 189). Another rather simpler and ordinary way of expressing this is to suggest that the intentions of the local authority to persuade cars to slow down are built into the object. That it is intended is demonstrated by its building; it is straight and of consistent dimensions, often marked by lines or triangles and often accompanied by warning signs at eye height. It is not likely to be confused with an unintentional bump such as one caused by poor road laying, even though the effect on the vehicle may be exactly the same.

Latour, in keeping with the tradition of the sociology of science, is keen to claim symmetry between human and non-human. But just because the actions of people often occur within the shaping and limiting context of institutions does not mean that humans are equivalent with non-humans. Latour's enthusiasm for recognising the significance of non-humans draws our attention to the contribution that they make to human lives, history and society. His aim of recognising how humans and non-humans are enfolded is interesting and persuasive. But despite his analysis of the failed Aramis transport system that Latour describes as a 'car-without-a-driver', an 'assemblage of things' (1996: 57) and 'a quasi-object, quasi-subject' (1996: 213), he leaves much unsaid about the routine, everyday, lived, embodied relationships between human beings and the material objects around them.

The embodied driver-car

Maurice Merleau-Ponty argues against a cognitive understanding of perception to show that the senses cannot be understood as machinic receptors that interface between an inner being and the outer world. What his phenomenology upsets is the 'common sense' notion of the outer world having a fixed geometry and stable order of relations that are given to human beings through their senses. Instead he shows that perception is situated and oriented to the kinaesthetic awareness of body so that, as he puts it, the body is 'geared' to the world which is how it becomes available to the senses. This way of understanding the embodied experience of the material world emphasises that the continuity of the world is because our bodies have a history of sensuous experience that we carry into the next moment. Merleau-Ponty sums up the embodiment of human being like this:

> There is, therefore, another subject beneath me, for whom a world exists before I am here, and who marks out my place in it. This captive or natural spirit is my body, not that momentary body which is the instrument of my personal choices and which fastens upon this or that world, but the system of anonymous 'functions' which draw every particular focus into a general project.
>
> (Merleau-Ponty 1962: 254)

He goes on to point out that this embodied orientation to the world that human beings carry into each moment, is not simply given at birth but is perpetually modified. Put this way we can see that the human component in an assemblage such as that of the driver-car brings to the relationship qualities that cannot be read off from either the mechanical or sense functions of the body.

Merleau-Ponty's understanding of perception is not dependent on individual senses generating disembodied information but on the mutual effect of all the body's senses

bringing about a state of perception that depends on bodily memory.[9] What Gibson saw as 'astounding' in the way that a driver can process information while overtaking is of course routine for people who drive regularly on two-lane major roads. The perception of road, other moving objects and embodied movement depends not on processing data as a machine would, but through experiencing the process in relation to bodily memory. For Merleau-Ponty the relationship between us and the phenomenal world of experience is best understood as like 'communicating' with it:

> … every perception is a communication or a communion, the taking up or completion by us of some extraneous intention or, on the other hand, the complete expression outside ourselves of our perceptual powers and a coition, so to speak, of our body with things.
>
> (Merleau-Ponty 1962: 320)

Nonetheless, a key communication between driver, car and road depends on visual ability; lack of sight is a bodily deficit that cannot, yet, be compensated for. The driver looks out from their seat in the car through a quadrant[10] at the world rushing towards her at a variety of speeds. Whereas for Gibson (1982b) it is a matter of the way that the image of the world is deformed on the retina of the eye as it moves through space, for Merleau-Ponty visual perception is an orientation of the whole body to the world through which it moves.[11] 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. So, our visual perception of the 'sleeping policeman', or even the sign indicating the presence of speed bumps, is tied to previous experience of the feel of the car going over bumps.

To think of driving as requiring the processing of enormously complex information selected and filtered through the visual field, sufficient for safe control of the vehicle,

makes it seem astounding. Yet it is a readily achieved skill by most human beings - very few people cannot learn to drive provided they have sight. The process of driving is largely habitual[12], an embodied skill which becomes a taken for granted way of moving through space – it is at between, roughly, thirty and seventy miles an hour that the driver-car in modern societies conquers space. Many competent drivers find slow speed driving difficult and disorienting and exceeding their usual top speed disconcerting. The gearing and steering mechanisms of most cars are also designed to work best within this speed range. The driver's sense of how fast they are going and what speed the road conditions will permit, becomes a skill embodied through the vehicle, not only its dials and controls but also its sounds and vibrations. Merleau-Ponty describes how the feather in a woman's hat, a blind man's stick and the driver of a car, are objects incorporated for the action in hand:

> To get used to a hat, a car, a stick is to be transplanted into them, or conversely, to incorporate them into the bulk of our own body. Habit expresses our power of dilating our being-in-the-world, or changing our existence by appropriating fresh instruments.
>
> (Merleau-Ponty 1962: 143)

So the human driver is habitually embodied within the car as an assemblage that can achieve automobility.[13] The driver-car can take on board friends, family, pets, shopping, a change of tyre, a change of clothing, as it moves into the world of roads, signs, other cars, buildings and so on.

The embodied orientation to a world of rapidly moving objects from a sitting but rapidly moving position is something that must be learnt.[14] Just as the child learns to walk, to run, to ride a bike and in so doing expands her or his engagement with the physical world, so the young person learning to drive will delight in that shift in their embodied relationship with the world that goes with driving the car, moving at a speed impossible without assistance to the body. For Merleau-Ponty perception in

movement, such as that necessary for driving, is dependent on orientation to varied fixed points - such as the road, lampposts, the dashboard, other vehicles. He says '… motion is a phenomenon of levels, every movement presupposing a certain anchorage which is variable' (Merleau-Ponty 1962: 279). Perception in movement is not about the objective judgement of distance and speed but about noting the changes from one moment to the next.

Some people seek such transformations of bodily experience simply for its own pleasure; the modern horse rider, the windsurfer, paraglider and so on. But driving a car is an experience that becomes entwined, for most drivers, in everyday practice such that it becomes ordinary and the re-orientation of the body to the rest of the material world ceases to be remarkable or pleasurable in itself.[15] Of course there are people for whom this type of transformation of bodily experience in the world is unbearable – they are unable to overcome their fear and disorientation and so avoid the experience of driving.

The embodied orientation to being in a fast moving object in a restricted space with other fast moving objects is a cultural phenomenon that has become characteristic of late modern societies. The driver assembles their learnt skill with the functionality of a car so as to be able to ‘enter a narrow opening and see that I can “get through” without comparing the width of the opening with that of the wings, just as I go through a doorway without checking the width of the doorway against my body’ (Merleau-Ponty 1962: 143). For most people in late modernity the experience of the driver-car becomes an aspect of bodily experience that they carry into all their other perceptions and engagements with the material world in a way that they take for granted and treat as unremarkable. The car does not simply afford the driver mobility or have independent agency as an actant; it enables a range of humanly embodied actions available only to the driver-car.

Conclusions

The driver-car is neither a thing nor a person; it is an assembled social being that takes on properties of both and cannot exist without both. I have argued that to understand driving as dependent on the mechanics of perception puts the emphasis on the presumed cognitive capacities of human beings whereas the concept of 'affordance' suggests that there is a prior physical relationship. But to treat the car as offering affordance to its driver obscures the complex social process in which human intentionality creates affordances in objects such as cars - and in human beings such as drivers. Actor network theory begins to open up the social history of connections between human beings and objects that bring about technical systems such as the driver-car. But ANT transforms such interactive and embodied relationships into ones that are textual and symmetrical and threatens to attribute equivalent agency to humans and nonhumans. Affordance hints at a dualism between mind and body that ANT counters forcefully but ANT overlooks the materiality of bodies, and the intentionality of subjectivity under the cover of dragging all materiality equally into society. I have argued that Merleau-Ponty recognises the embodied and intentional nature of human relationships with objects without putting the apparatus of perception between minds and the material world. The assemblage of the driver-car produces the possibility of action that once it becomes routine, habitual and ubiquitous becomes an ordinary form of embodied social action. People who have become familiar with the driver-car through participating in the assemblage become oriented to their social world, partly at least, through the forms of action of which it is capable. Social institutions – legal systems, the conventions of driving, traffic management – develop to embed the coordinated habits of driver-cars within the social fabric. The use of cars is not then simply functional, a matter of convenience, nor is it reducible to individual, conscious decision. Like the wearing of clothes or following conventions of politeness, the actions of the driver-car have become a

feature of the flow of daily social life that cannot simply removed or phased out (like dangerous drivers or leaded petrol).

As political concern responds to the threats to life and environment of the car powered by fossil fuels, it is important to recognise that the car is not simply a mode of transport and that any call for a 'shift' to more ecologically sound mobility requires much more than rational choice about the consequences of different forms of transport. The automobility that is realised in the driver-car serves as both an extension of the human body and an extension of technology and society into the human. The driver-car is socially embedded as a system of affordances, actor networks and embodiment that is not going to be foregone or forgotten easily. The object of the car is likely to undergo a dramatic transformation within the next few decades,[16] yet even if the weight, body shape, controls, engine and fuel are transformed, it seems likely that the driver-car will continue to include an object on wheels in which a human being can sit and, with simple adjustments of peripheral limbs, steer and direct to go faster or slower. Both the technology of the motor car and the skills and techniques of the driver may be superseded or improved – as have the horse / rider and walker / shoe – but some form of driver-car is likely to remain.

The symbiotic relationship between driver and car is one that has transformed the material environment and the nature of sociality in late modern societies (see Dant and Martin 2001) and it is unlikely that it will be put aside easily. The empirical nature of the driver-car – including its status as a form of mobility capital[17] – deserves urgent study so that policy discussions take into account what is entailed in bringing about a 'modal shift' to more sustainable forms of transport and mobility. The study of the driver-car will also contribute to an understanding of the various assemblages that intermediate between the persons and societies of the late modern world.

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[1] See for example: Chinoy 1955; Goldthorpe et al. 1968; Beynon 1973; Altshuler et al. 1984; Flink 1975; 1988; Gartman 1994.

[2] See for example: Barthes 1993 [1963]; Lefebvre 1971; Liniado 1996; O'Connell 1998; Sachs 1992; Thoms et al. 1998

[3] Any connection with Deleuze and Guattari's notion of the 'machinic assemblage' is, of course, coincidental (1988:73).

[4] Sharrock and Coulter made the same point in relation to bananas, e-coli bacteria and mothers - 1998: 155.

[5] This is a recurring trope in Latour's writing about seat-belts, hotel key-fobs, sleeping policemen and the Berliner key - Latour 1991, 1992.

[6] Latour does have some photographs of the Aramis transit system (1996) and photographs that are integrated into the description of the scientific fieldwork that show humans interacting with objects (1999).

[7] There are clearly degrees of intentionality that can be ascribed or discerned in animals - horses demonstrate some, scallops do not. Nonetheless, Michel Callon writes that the scallops in St. Brieuc bay ‘must first be willing to anchor themselves’ (1986: 211) yet in what follows there is no account of how the scallops exercise intention or will. Because the scallops' resistance to anchoring is not consistent - some do, some don't - Callon is able to impute intention to their individual behaviour, as if the scallops were exercising intention. Since scientists count the number of anchoring larvae Callon treats the process as symmetrical with the election of representatives. He might as well treat the counting of road deaths as equivalent to the election of representatives. Electors demonstrate intention in their

action, scallops that anchor and people who die on the roads are succumbing to circumstances independently of their intentions.

[8] Latour claims that the bump in the road known as a sleeping policeman 'does not resemble one in the least' (1999: 188). I've always fondly imagined a policeman asleep under the tarmac, causing an elongated and solid lump much as if he was under a duvet. Another way of thinking of it is that the effect on the car is much the same as if one had driven over a policeman.

[9] 'The body is borne towards tactile experience by all its surfaces and all its organs simultaneously, and carries with it a certain typical structure of the tactile “world”' (Merleau Ponty 1962: 317)

[10] Car windscreens are nowadays usually curved and slanted, indicating the driver’s visual zone of attention as much as significantly improving airflow.

[11] Sight may lead this orientation to other objects so the driver's eye may take a 'hold' on an object and has a 'certain power of making contact with things' but their visual presentation 'is not a screen on which they are projected' (Merleau-Ponty 1962: 279) as a train passenger's view might be construed.

[12] '… habit … is knowledge in the hands, which is forthcoming only when bodily effort is made, and cannot be formulated in detachment from that effort' (Merleau-Ponty 1962: 144).

[13] Don Ihde suggests that the car becomes a symbiotic extension of the body of the driver (1974: 272).

[14] 'Motion is a modulation of an already familiar setting.' (Merleau-Ponty 1962: 277).

[15] Although there are of course many people who take pleasure in dealing with cars and driving as is shown by the range of car magazines and television programmes devoted to cars (but not washing machines and other less pleasurable objects). Many people gain pleasure from driving – but there is no reason to suggest that the nonhuman components in the assemblage gain any such pleasure.

[16] See for example the fascinating discussion of the Hypercar in Hawken, Lovins and Lovins 1999.

[17] The driver-car represents an accumulation of physical, financial and social resources that is controlled by an individual but operates in the public context of roads, traffic systems and taxes. A study of the variations in the mobility capital entailed in the driver-car would bring out its inflected forms (gendered, aged, culturally specific, powerful, protected and so on) as well as providing a basis for comparison with other mobile beings such as the passenger, the pedestrian and the cyclist. It would also highlight the social exclusion that results from relative lack of access to mobility capital.