

## ESSAYS

### Revealing the ‘Animal-Industrial Complex’ – A Concept & Method for Critical Animal Studies?

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#### Abstract

This paper returns to Barbara Noske’s (1989) concept of the ‘animal-industrial complex’ in order to develop and re/present it as a key organizing frame of analysis and research collaboration for the field of critical animal studies (CAS). In presenting various ways of refining its definition and illustrating some intersections between both *different* forms of animal use *and* with other ‘complex’ concepts, the aim is also to help build CAS capacity in analyzing the role of political economy in shaping human-animal relations. Whilst keeping the permeability of the boundaries of the complex very much to the fore, this paper nevertheless focuses on farmed animals and case studies virtual methods of apprehending ‘livestock’ genetics companies as one approach for potentially bringing the animal-industrial complex into a more clearly delineated space of scholarly and public critical scrutiny.

**Key Words:** Animal-industrial complex, Barbara Noske, political economy, genetics, methods.

Global farmed animal production is increasingly understood as both a problematic and emblematic controversy in debates around the unsustainability of global capitalism. The ongoing expansion of this sector under the material-semiotic rubric of the so-called livestock<sup>1</sup> revolution (notably in ‘developing’ countries) sits in marked tension with the various sustainability question marks increasingly placed around these sets of globalized practices. Naturalized via an assumption of inevitable human population growth and the global dissemination of a hegemonic ‘human’ that, by definition, consumes meat (and a lot of it) the ‘revolution’ – for it truly is at least in terms of economic, social, environmental and interspecies relations – represents both a considerable capitalization move by globally positioned ‘livestock’ corporations and is effectively an attempt to normalize a wide range of identities, relations and practices via the conduit of dietary change.

Here sustainability concerns include, at the very least, direct environmental pollution, greenhouse gas production, human health impacts of consumption and labour, effects on communities, zoonotic disease and ethical questions around the killing of animals. There are

a further set of questions concerning how these issues are being elaborated by the molecular turn (biotechnology) and the ways in which such novel breeding techniques are proffered by scientists and industry as the means to secure the livestock revolution (see Twine, 2010a) - to usher in a new era of productivity which assumes the surmounting of pre-existing (especially biological and environmental) limits as a *technological* problem and inevitability. This is galvanized by an emerging Western policy discourse of food security that uncritically reiterates an urgent need to double food production in order to meet the demands of a growing human population (see Tomlinson, 2011). In tension with cultural calls for the reduction of the consumption of animal products the assumption of a productivist livestock revolution also involves varied attempts to make animal agriculture more efficient in lieu of changes to consumption levels that could threaten pre-existing markets. Such attempts include manipulating genetics in animal breeding and also measures to capitalize upon the waste products of animal production such as the corporation Cargill's scheme to generate energy from beef processing waste in Alberta, Canada. We can note simultaneously a vision of a 'green' livestock revolution and one that adds significantly to the present approximate annual global kill figure of 56 billion land animals. Genomics and biotechnology generally are fetishized by scientists and policy makers as the means by which to reinvent capitalism as a new more efficient and environmentally benign project often under the banner of the knowledge based bio-economy (Cooper, 2008; Twine, 2010a) which in its very enunciation pretends to portend to ideas and not somehow also to material, bodily repercussions (see Kenway et al, 2006). For meat scientists, an under-theorized constituent of the animal-industrial complex, conjoined in alliance with corporations and policy makers, 'developing' countries comprise a particular object of biopolitical scrutiny and potential resource. This is not only because their human populations are simply not (yet) eating 'enough' meat and dairy products and are therefore zones of under-capitalization, but because their populations of farmed animals are similarly conceived as biopolitically backward, possessing 'inferior genetics'. With such examples capitalist biopolitics suspends a moral human/animal binary in order to promote capitalization<sup>2</sup> (see Holloway & Morris, 2007; Twine, 2010a, especially chapter 3) and is arguably informed by the historical lineage of discursively placing various classed and racialized human others as 'closer to animal'. In this manner capitalism strategically employs contradictory accounts of human/animal difference that are enabling for various development and accumulation projects. Thus we can note attempts at knowledge transfer (often framed philanthropically) to improve the genomics infrastructure of developing countries, to train farmers therein, to assess herd genetic

diversity, to catalogue, to introduce biopolitically superior Western stock, but also further up the commodity chain, to introduce more intensive farming technologies. Such policies incorporate an assumption not only that Western levels of meat/dairy consumption are superior and somehow more constitutive of normative ‘ways of being human’, but also that Western production methods are superior.

This paper explores this techno-capitalist imaginary by (re)turning to the concept of the ‘animal-industrial complex’ (Noske, 1989), a significant component of the broader global food system. Through such a return this is a proposal to reinvent and rejuvenate Barbara Noske’s work and to encourage further research and activism that can address urgent matters of animal, ecological and human flourishing which are shaped by and within the practices of the complex. The paper aims to ‘reveal’ the ‘animal-industrial complex’ in two senses. Firstly by returning to Noske’s concept the aim is to tease out its original perceptive dimensions but also to add further rigour so that it is less of a rhetorical term but actually begins to be embodied by a delineated set of actors, relations and usable definitions. Whilst a hyperbolic sense of the concept has not been without use in the sense of a shared discourse between those politically interested in challenging its power; working toward, in this paper, a more refined definition can provide the critical animal studies research agenda much more focus, shape and coherence. Moreover, this can be valuable for understanding the context of the complex within broader relations of political economy, for a better appreciation of intersectionality<sup>3</sup> and in allowing the concept to do better political work for those engaged in its critique. Whilst this paper can only make a modest beginning in this endeavour it can, it is hoped, initiate a collaborative process whereby the concept can be refined, mapped and utilized by academics, activists and activist-academics as befits the goals of critical animal studies. Secondly this paper begins to explore which methodological approaches critical animal studies researchers<sup>4</sup> can use to reveal the complex itself. Here I briefly consider the utility of a virtual online method for explicating the relations of the animal-industrial complex which aim to articulate its global reach and local specificity. Since, as I will contend, it is impossible to avoid a definition of the complex as broad and overlapping I shall necessarily illustrate this method using a more manageable, narrow, yet important, constituent element of the global production of animals for food, namely, ‘livestock’ genetics corporations.

## **What is the Animal-Industrial Complex?**

The first discernable scholarly mention of the term is found within the work of Dutch anthropologist Barbara Noske's text *Humans and Other Animals - beyond the boundaries of anthropology* (1989). Noske devotes an entire chapter to discussing the concept. It has not been used very much since in academic work<sup>5</sup> but seems to have at least in a limited sense entered critical discourse around human-animal relations. My concern is that its use and meaning may have become simply assumed and almost rhetorical; deployed monolithically to represent, but also to reduce, the myriad complexity of the multiple relations, actors, technologies and identities that may be said to comprise the complex. I think one of the central tasks for the nascent field of critical animal studies has to be, via its championing of interdisciplinary analysis, to return to this concept, and to restore and tease out a sense of its nuance and complexity. This is not to say either that this is a small undertaking or, indeed, that research is not already being done to perform exactly this task, even if this might not be explicitly embedded within CAS or directly using the Animal-Industrial Complex (A-IC hereafter) terminology.

Noske's concept, without any refinement, already piques the CAS interest for two clear overlapping reasons. The first revolves around her intention to contextualize the use of animals as food not primarily within a rubric of inadequate ethical frameworks but as part of the wider mechanics of capitalism and its normalizing potential. Thus a large part of the answer to the question of 'why do 'we' exploit so many animals' is found here in terms of the way in which "animal industries are embedded in a capitalistic fabric" (Noske, 1989: 22) combined with an assertion that the "main impetus behind modern animal production comes from monopolistically inclined financial interests rather than from farmers, consumers or workers here or in the Third World" (ibid.). This is not to deny a distributed and networked agency at play in the A-IC but to underline that corporate capital accumulation has been a significant factor in the emergence of globalized industrialized animal production. Moreover corporate interests have had a direct interest through marketing, advertising and flavour manipulation in constructing the consumption of animal products as a sensual material pleasure and one that can be an easily acquired identity resource for a wide range of consumers. Additionally technological innovation in the production process is often sold to farmers as directly benefitting their business yet the largest returns tend to be experienced

much higher up the production chain. Noske's attempt here to clarify whose interests are served by the emergence and intensification of the A-IC complement well the stated aim of CAS to foreground political economy and to intersect a critical analysis of human-animal relations with a critique of capitalism (Nibert, 2002; Best, 2009; Twine, 2010a). This interest is also part of the CAS commitment to interdisciplinarity (Best, 2009). Mainstream animal studies shares this interdisciplinarity but makes no special case for either political economy or the importance of capitalism in shaping human-animal relations.

This takes us conveniently to the second main reason behind CAS affinity with the idea of the A-IC, namely Noske's emphasis on intersectionality. Whilst her interest in political economy already signals an attentiveness to the relationship between the human exploitation of other animals and economic structures and power relations she also covers such issues as health risks to human workers in, for example, slaughterhouses, the impact of the complex on developing countries, environmental consequences, antibiotic use, and elsewhere in the book she discusses intersections of gender, nature and animality. It is significant that when discussing the A-IC she also includes a section on animal research. Whilst nowhere does she offer a clear working definition of the 'animal-industrial complex' or a schematic to show what it might comprise she does draw our attention to important matters of scope and scale that are crucial to refining the concept. By gesturing to the issue of animal research Noske essentially questions whether agribusiness can be said to delineate or exhaust the boundary of the complex and she answers this, correctly, with a resounding, no. Such attentiveness to the permeability of the boundaries of the A-IC is crucial for teasing out the material and ideological interconnections between different spatial and cultural contexts of human/animal relations. Furthermore scope should also mean theorising the interconnections between the A-IC and other sectors of the global economy.

Although Noske does not reveal her sources it seems a reasonable assumption that her A-IC concept is in part influenced by the older idea of the military-industrial complex. Whilst there is much popular and scholarly writing on the use of animals in war this connection is similarly not noted. The military-industrial complex concept emanates from the speechwriters of former US President Eisenhower's farewell address in 1961 who warned the country of the power of this emerging complex, taken to refer to the close relations between a government's military policy, the various armed forces and the corporations that support the military. Some versions of this also included the role of academia and scientific knowledge.

In this way it is not dissimilar to the later idea of the ‘triple helix’ (Etzkowitz & Leydesdorf, 1997) put forward to characterize the changing role of the academy in the global knowledge economy in terms of its increasingly close relationship with government and the corporate sphere. This triple helix is itself enmeshed within the contemporary A-IC (see Twine, 2010a). Since the 1960s a partly analogous host of ‘industrial-complex’ terms have been used in various ways. They potentially provide a useful means by which the material and semiotic overlaps between on the face of it apparently different parts of the global capitalist economy can be theorized.

There are at least three further examples to be noted here of other complexes. Firstly the ‘prison-industrial complex’, defined as a set of bureaucratic, political, and economic interests that encourage increased spending on imprisonment, regardless of the actual need (Schlosser, 1998) is a considerably more widely used and cited term than the A-IC and could be drawn upon to highlight links between the incarceration of animals, of humans animalized by ‘race’, class or gender and also of humans convicted of attacking the A-IC in the context of the increasing criminalization of some forms of activism<sup>6</sup> (Potter, 2011). Animals are also used therapeutically in some prisons and as Fitzgerald (2012) points out, in the US and Canada many inmates are employed in the slaughtering and ‘processing’ of animal bodies. This is a source of cheap labour which symbolically pairs animalized humans and animals or ‘nature’ together in a similar manner to the phenomena of environmental racism (see Higgins, 1994) as well as perhaps providing an economic rationale for the perpetuation of a specific prison population. Fitzgerald correctly alerts us to a particular problem of employing inmates in this way given other research findings that suggests a tendency toward psycho-social brutalization in such labour. Consequently such labour could seriously frustrate inmate rehabilitation.

Secondly, the idea of an ‘entertainment-industrial complex’ has been in circulation since the 1980s (e.g. Christopherson & Storper, 1986) and was initially coined to refer to structural changes in the US film industry. This could be broadened out to think through the intersections with the A-IC in the way that zoos, theme parks and ‘pet’ keeping have become considerable forms of profitable ‘entertainment’ and more generally can be linked into other theoretical approaches most obviously the valuable, if problematic, work on the ‘culture industry’ by members (especially Theodor Adorno and Max Horkheimer) of the neo-Marxist Frankfurt School. Indeed Shukin’s (2009, see ch.2) recent skilful argument for an historically intersecting triangulation between animal capital, the film industry (the use of gelatine being

perhaps the most obvious material enmeshment) and the automobile industry is a good example of both the sort of analysis required and the porosity within and between different ‘complexes’.

Thirdly sociological research has also engaged with the idea of a ‘pharmaceutical-industrial complex’ (Abraham, 2010) which speaks to the ‘pharmaceuticalization’<sup>7</sup> of Western societies defined as “the process by which social, behavioural or bodily conditions are treated or deemed to be in need of treatment, with medical drugs by doctors or patients” (Abraham, 2010: 604). There are at least four main points of overlap between the ‘pharmaceutical-industrial complex’ and the A-IC. Firstly a major point of intersection revolves around the use of animals as experimental subjects in the research and development of new drugs. Thus if the ‘pharmaceuticalization’ thesis is in a sense a critique of Western societies for using drugs to try and treat what in effect are mental and physical illnesses with a considerable social, economic and political aetiology then this also calls into question those forms of animal exploitation that are especially caught up in this trend. Secondly many of the world’s leading pharmaceutical companies including Abbott, Pfizer and Ely Lilly/Elanco have considerable capital interests in producing drugs for animals across various sectors. Such drugs are often represented under a rubric of ‘animal health’ but in the agricultural or sporting context health and welfare can often be proxies for the productivity of the animal body (Twine, 2007). Typically these are administered to farmed animals to alter meat or milk in some way. Sometimes this becomes more visible and prominent in the shape of *human* health scares. Although growth hormone in milk is a well known example, more recently, in June 2011 Pfizer subsidiary Alpharma was told by the FDA to cease sales of Roxarsone (also known as 3-Nitro) when a carcinogenic form of arsenic from the drug was found in the livers of broiler chickens. In the case of Roxarsone it has been used to improve both productivity (weight gain) of animals and the aesthetics (meat pigmentation) of meat. Thirdly, and relatedly, the aforementioned pharmaceuticalization phenomenon also extends across species with, for example, the application of anti-depressant drugs to dogs. Although the 2011 US FDA approval of Ely Lilly/Elanco’s canine anti-depressant known as Reconcile (see <http://www.reconcile.com>) *could* be read as a welcome subjectification of companion dogs it would be remiss not to interpret this in terms of familiar capital accumulation strategies and to underline the potential side effects to dogs (and others) of being administered such drugs. Fourthly there is good evidence (e.g. see Twine, 2010a, ch.7) to suggest that the consumption of animal products at certain levels now surpassed in many

Western diets (and increasingly in non-Western ones) is productive of a wide range of health problems which in itself is generative of pharmaceutical capital (and of course more animal experimentation). This is worth underlining since it also highlights intersections within the A-IC between the often separated issues of animal experimentation and meat/dairy consumption.

From these additional complexes we can note how capitalism creatively commodifies its own excess, its own ailments. Approaches to climate change mitigation via a carbon tax are arguably the latest case in point. Many of the aforementioned ‘complexes’ outline examples where the mass production of various commodities arguably not conducive to human or animal well-being are anyhow pursued and capitalized upon. Thus war, human incarceration, meat and dairy production, and mental and physical illness have been transformed into profitable enterprises that, in turn, set up economic interests in their perpetuation. Although all of these have been naturalized by a familiar ideology that would root them in an assumed ‘human nature’ (as has capitalism itself) they in fact reveal major tensions between corporate agency and democratic oversight. Contextualising the A-IC within its broader milieu of such other complexes is an important initial step that is reflexive to questions of scope and generative of intersectional and critical knowledge around our contemporary hegemonic economic and cultural forms.

Questions of scope also arise in the importance of cautioning CAS away from a political vision (especially as it encompasses veganism) that a) might reduce politics to consumption, and b) might assume the consumption of all non-animal products to be morally benign. When in 2006 food writer Michael Pollan spoke of the ‘vegetable-industrial complex’ in relation to E.coli scares<sup>8</sup> it served inadvertently as a reminder that any consideration of the A-IC must also consider its interdependence with the crop and vegetable industries most notably, though not solely, in the form of animal feeds. There is thus no moral dichotomy here for a pro-vegan CAS in terms of a simplistic valorisation of non-animal products. This underlines the often made point that veganism is more than ‘just a diet’ and is better seen and practised as a systemic and intersectional mode of critical analysis and a useful lived philosophy counter to anthropocentrism, hierarchy and violence<sup>9</sup>. Similarly it is not surprising that the geographer of the global food economy Tony Weis has used the concept of the ‘temperate grain-livestock complex’<sup>10</sup> (2007). He uses this in an interdisciplinary manner to evoke the historical, spatial and political economy dimensions of an important feature of global food

relations. He outlines how during the twentieth century both grain and animal production came to be centred on a small number of domesticated species and that increasingly, especially through the growth of soybean production, the 'livestock revolution' and intensive high-input crop production became very much interconnected. Thus any analysis of the globalizing dimensions of the A-IC cannot avoid factoring in economic, historical, spatial and technological changes in plant crop production as crucial to what Weis refers to as the 'meatification' of the global diet whereby population has approximately doubled globally since the 1950s but meat production has increased almost fivefold in the same period (2007, pp16-20). Including crops necessarily complicates the analysis of the A-IC and encourages a focus on areas such as the local impacts of soy production, corporate practices, plant biotechnology, transnational food regulations and standards as well as governmental agricultural policies. Furthermore it makes more likely the narrowing of the gap that is often noted academically and politically between the question of the animal and that of ecology.

It is worth pointing to a note of caution toward the discourse of the complex in the sense that it may suggest something akin to a conspiracy theory. On the one hand it points to relatively powerful alliances and networks in particular sectors of the global economy that strive to maintain a hegemonic position. It underlines how capital accumulation and resource control may become the overriding rationale in spheres such as global food production or military conflict and how these relations are implicated and used as conduits for geopolitical strategies. Yet it would be a mistake arguably to overplay the degree of control that particular actors and actor-networks are assumed to have. In other words the discourse of the complex ought not to become fatalistic.

Clearly it is not only the exploitation of animals for their meat, milk, eggs and skin that has come under the rubric of capitalist processes but also such practices as the use of animals in sport, animal experimentation, the companion animal sector and the zoo industry. If CAS scholars are to take on, as I suggest they should, the A-IC as an organising concept, then the continued mapping of these interconnections between overlapping sectors is a significant task therein. If these may be referred to as questions of scope then Noske also points us toward the issue of scale. Alluding to the rhetoric of agribusiness that creates a promissory discourse that represents global 'livestock' corporations as somehow benign and even philanthropic providers to the developing world (a discourse that has since been much recycled in the context of biotechnology), Noske (1989: 29-34) begins to briefly outline some of the

economic and consumption inequities that comprise the unmistakably global character of the complex.

I would assert that CAS lacks a sophisticated understanding of how the complex endures across different regional, national and global scales. This degree of complexity makes clear that a rhetorical concept of the complex is wholly inadequate and needs to be radically strengthened with expertise from, for example, sociologists, science and technology studies (STS) scholars, geographers and critical economists. These disciplines have established traditions, theoretical and methodological approaches to examining, for example, the global food system, that are of obvious relevance to CAS scholars interested in understanding the A-IC. I briefly outline some of these later. Simultaneously there is a need for non-CAS scholars in these disciplines to become reflexive to the multi-levelled importance of examining the A-IC and to be invited to engage with CAS. This is a useful strategy for the dissemination of CAS overall.

#### - **The Three Meanings of Complex**

In thinking through how we might further add to Noske's A-IC concept I want to briefly consider three common uses of the word 'complex' as I think they can be heuristic overall. Firstly 'complex' means 'difficult to understand', complicated, hidden, and impenetrable. Secondly it means a conglomerate, a network, structure, system, an association. Thirdly, to have a complex is to have 'a psychological problem' to experience emotions such as anxiety, fear, disgust and obsession and to unreflexively exploit social psychological processes such as stereotyping, denial and projection. It is not too difficult to see how these three meanings can inter-relate in the context of the A-IC.

The complicated partly hidden character of the A-IC is bound up in the process of denial which can be framed in the terms of sociologist Norbert Elias (1978) who argued that Western society underwent what he referred to as a 'civilizing process' between the 16<sup>th</sup> and 19<sup>th</sup> century. This involved the emergence of a whole set of classed bodily and affective dispositions (Elias specifically focussed on manners) that can be read as the social construction of a new 'human' relationally defined against constructed understandings of both animality and human otherness. He illustrates how a multitude of embodied practices such as eating habits become emotionally charged with embarrassment and shame. There is a

wealth of literature during this time outlining the proper way to act in terms of etiquette and manners. These employ animal and classed others (peasants) as examples of how not to behave. Elias writes “the use of the sense of smell, the tendency to sniff at food or other things, comes to be restricted as something animal-like” (1978: 203). The meanings attached to various embodied practices in the 16<sup>th</sup> century have changed and become in a sense ‘domesticated’ by the nineteenth. The thresholds of embarrassment and shame have shifted. In one sense this process was about concealing the ‘animal’ in the ‘human’, dealing with the ‘shame’ of our connectedness to materiality<sup>11</sup>. This theory speaks to what I have previously referred to as the ‘internally torn’ model of the human which comes to be constructed around the idea of a human/animal binary which is productively called upon to perform (intra) human difference (see Twine 2010a: 10). We can note here a disavowal of the ‘animal’ within the human, but also, in part, an external banishment of human violence toward other animals. Thus significantly, this ‘civilizing process’ also involved the partial concealment of violence from visible everyday life and can be interpreted as one driver behind the social sequestration of animal slaughter. If this was part of a general shift against the overt public display of violence as counter to emerging social norms rather than something more specific to human/animal relations then it also had the effect of quelling the potential disruptive potency of this violence to call into question the naturalization of human/animal hierarchy. Thus this means that it is inaccurate to argue that the sequestration of slaughter can be reduced to a conscious decision to conceal violence for political-economic ends but was in fact embedded within a broader socio-historical trend. Nevertheless this new Western ‘human’ consolidated its power over and against the ‘animal’ and was able to an extent to keep its barbarism hidden from view and self-constitution.

From a CAS perspective these points underline a major contradiction of claims for Western civility and echo accordingly with the description by Bauman of modernity as ‘janus-faced’<sup>12</sup> (1989). Yet it is precisely the affective processes of denial and projection that are apt to help explain both the possibility and precarity of such a social formation of the ‘human’, inseparable from its histories of class, gender, ‘race’ and species domination. In what is now a very familiar argument from CAS, and earlier from ecofeminist writing (e.g. Plumwood, 1993), the moral significance of harming those deemed inferior has been denied by projecting a whole interconnected cluster of discursive meanings onto ‘them’, where, for example, the ‘animality’ of ‘animals’ is merely assumed, and the ‘animality’ of various ‘humans’ is (also) culturally produced. Denial here is also applied to the material labour and active agency of

the inferiorized (Plumwood, 1993) and the way in which that denial is materially expressed spatially, in the design of technologies and buildings that, in our case of animals, help to secure the relative invisibility of the violence acted out against their bodies. Thus meanings one and three of ‘complex’ can do the appropriate work to outline the inseparable material-semiotic dimensions of the A-IC<sup>13</sup>. The second meaning of ‘complex’, to mean network, conglomerate or system is similarly useful for thinking how the A-IC achieves and sustains what we can refer to as ‘material-semiotic’ hegemony. What networks are at play? How do they interconnect? How are particular speciesist norms naturalized, carried and circulated? Why are such norms so successful at recruiting adherents? Relatedly, this second meaning of ‘complex’ is also further useful to addressing our interest in scope and scale. A pertinent question here is to ask what role the mass online and offline media plays in consolidating the symbolic dominance of the A-IC (see Cole & Morgan, 2011), and to analyze how this is being resisted? Relatedly, an important research question is to probe the extent to which dominant assumptions (and practices) around the human/animal binary have extended culturally and how might local resistances have expressed themselves?

This exploration of the three main meanings of ‘complex’ is intended to contribute to definitional work around the A-IC though an actual definition ought to be a collective work-in-progress amongst the CAS community. Here I offer an initial basic and succinct definition of the A-IC as *a partly opaque and multiple set of networks and relationships between the corporate (agricultural) sector, governments, and public and private science. With economic, cultural, social and affective dimensions it encompasses an extensive range of practices, technologies, images, identities and markets.* I place agricultural in brackets only to highlight my personal interest in this paper. As I have already indicated, a working definition of the A-IC must not to be confined to this domain. However empirically it is both useful and essential to narrow down the analysis and to focus on case studies within each sector of animal exploitation while attempting to also draw useful broader connections. I see this as setting one of the most important research agendas for CAS. Whilst this is obviously a mammoth task it is worth reiterating that some CAS and much non-CAS identified research already conducted is of obvious relevance. I would also add that the CAS community needs to move to a model of research that is more collaborative and international, not unlike that found more typically in the natural sciences, in order to pool labour and better grasp the aforementioned issues of scale in the globalizing trajectory of the A-IC.

The emergence of CAS of course is part of a tension, a politics within the broad academic interdisciplinary field of studying human/animal relations. Non-CAS identified work in this field is still going to be very much of use but even beyond this there is much academic work that CAS ought to be happily parasitic upon, and influential toward<sup>14</sup>. For example when thinking about the A-IC in terms of agriculture; sociologists, science and technology studies (STS) scholars, geographers and critical political economists are all of relevance. As mentioned above, such disciplines have established traditions, theoretical and methodological approaches to theorizing the global food system. I will briefly discuss some of these now as pointers for future research.

The social-scientific study of food has very much become a growth area over the last twenty years contextualized by a growing interest in environmental issues, the intersections of social inequality with food and related questions of public health. One well known area of research is based around analyses of the commodity chain<sup>15</sup>. Instead of focussing on a particular sector of the food industry this approach follows the commodity as it moves through different stages of production and consumption with the intention of understanding what are referred to as 'commodity stories' in order to better grasp moments of commodification and the complicated relationships between 'people, places and commodities' (see Hughes & Reimer, 2004: 1). It is not surprising then that this work overlaps with an interest in the A-IC even if that concept is not deployed. For example, the well known geographer and political economist Michael Watts has written in this tradition specifically looking at the US hog (pig) and broiler chicken industry (2004). Watts probes the extent to which the hog industry has followed in some respects and differed in others from the trajectory of the broiler industry in terms of, for example, mechanization, contract farming and the impact of the biology of the animals themselves. Although the tone is largely (politically) humanist, studies such as this are immensely useful to CAS efforts to explicate the A-IC. Analyses based around commodity chains represent one approach from Marxist political economy broadly construed.

The emergence of actor-network theory (ANT) during the 1990s offered an alternative conceptual and methodological approach to studying social phenomena that has been influential upon social scientists interested in food and agriculture. Some of these points of tension between political economy and ANT revolve around how to conceptualize globalization, how to understand scale and how to understand agency. There have been influential attempts to argue that ANT offers more convincing approaches to the social

scientific research agenda on food and globalization (e.g. Whatmore & Thorne, 1997) as well as perspectives that are more mutual and conciliatory between the two approaches (e.g. Busch & Juska, 1997; Castree, 2002). Although it is not new to recognize that ANT is of potential use to the study of human/animal relations (Whatmore & Thorne, 2000) in large part due to its insistence upon the agency of nonhuman actors<sup>16</sup> within a given network, some of its other premises are also of interest to how CAS scholars might approach and think the A-IC. As well as being critical of political economy approaches for assuming a passive nature, Busch & Juska argue that they tend to reify corporate actors whereby one begins to speak of particular companies acting in this or that way, which somehow renders opaque that particular people are involved in making particular decisions and actions possible (1997: 691). They state that this is not a retreat to an asociological focus on individuals but a methodological call for analyses to focus upon how different actors achieve power within the context of specific networks, “a plea to begin to think of the globalization of agriculture in terms of the extension of actor networks” (ibid. p692). Of course this does not mean that we no longer analyze corporations but that we think more specifically about what particular people within a corporation are doing, as well as how the corporation overall is linked into other networks. Similarly ANT uses the idea of the actor-network to deconstruct the traditional social science distinction between micro and macro. Here globalization is understood as an extension of actor-networks made possible through the strategic enrolment of particular technologies that allow the power of ‘action at a distance’ to occur (ibid. p694). Again the research focus is on how networks link together and endure, the extent to which they can be made open to scrutiny, on particular enabling technologies, and how weak points may be pinpointed. Although this merely provides a very brief flavour it is clear I think that the confluence of political economy and ANT approaches to food and agriculture are exactly the sorts of social science work that CAS should be networking itself into. In attempting to better understand the A-IC this can mitigate against the repetition of potential methodological and conceptual mistakes, provide a range of useful approaches and ultimately give CAS a presence within these fields.

### **CAS Methodology – A brief look at Livestock Genetics Corporations**

In this final section of the paper I employ virtual methods to emphasize various online modes of data gathering and presentation that are of use to the wider CAS community in

understanding elements of the A-IC. Within my focus upon animal agriculture I in turn centre in on the operation of livestock genetics corporations. Indeed I advocate that future research ought to deploy particular case studies (for example of specific companies and their various actors) and that generally a high level of specificity is required in order to try and understand the more complicated network of the A-IC. Moreover it is only through such grounded empirical research that CAS can build up a viable picture of the actors and relationships involved in different yet connected parts of the A-IC. In a sense the vast majority of people are actors in the A-IC by virtue of being consumers of animal products; the practices and relations of the A-IC are socially ubiquitous even if the average consumer is unlikely to reflect upon their own everyday practices as being part of a wider complex. Here the CAS interest is in making the animal reappear, revealed and rematerialized from varied capitalist processes of fragmentation and absencing (e.g. Adams, 1990). Critical thinking around the A-IC first requires that it is brought into general relief<sup>17</sup>.

Livestock genetics corporations (LGCs) are an interesting part of the A-IC partly due to their social invisibility. Even though they all have very visible web-sites and play an important role in the A-IC they constitute part of the unconscious of animal consumption to the majority. If the tradition of political economy and more recently ANT has been adept to re-historicize, re-spatialize and so re-politicize the commodity we can note an affinity with a vegan critical animal studies that wishes to demystify the various ways in which animals become commodities and also to contest their commodity or property status itself. Work to reveal LGCs then can be a small but significant part of outlining the A-IC. As I have previously argued, social science research can act “against the sequestration of networks of science and commerce in animal breeding. Here social science can have a civic role to help a broader public adequately scrutinize novel configurations of food production, science, technology and the economy” (Twine, 2010a: 103).

But what role do LGCs play in the transformation of animals into commodities that are consumed by humans? The role of people working for these companies is essentially in the research, development and distribution of new genetic lines of the major farmed animal species. They are often networked into academic animal science departments by providing funding, and they sometimes receive funding from national governments. This forms a biopolitical coalition disciplining the animal body and inciting new strategies of capital accumulation from farmed animals. LGCs are increasingly global corporations that have

expanded into new territories that have traditionally had lower rates of animal product consumption vis-à-vis the West. They are involved in the export of animal gametes but also live animals around the world. All are researching new opportunities from the capitalization of genomics as applied to animal breeding<sup>18</sup>.

Although the internet is undoubtedly a surveillance and communication technology that developed out of the military-industrial complex it is, as WikiLeaks have shown, a medium of revelation and dissemination. Just as the case of the Israeli activist group Anonymous for Animal Rights subverting CCTV technology to live broadcast on their web-site 24/7 coverage of battery caged hens<sup>19</sup> has shown, the internet itself is perhaps our best contemporary example of the uncontrollability of technology. It can inadvertently or purposively make visible dimensions of the A-IC that before its existence would not otherwise have been so easily unveiled. This is not to say that researching LGCs is straightforward since their competition with other companies provides another driver for secrecy alongside that of being involved in a business that has to be affectively managed due to its involvement in the mass slaughter of animals. In the case of corporations involved in the A-IC this informs the specific modes of mediation of online communication and presentation. One further caveat is that an over focus on virtual methods could simply reinforce a rather abstract perspective to the study of other animals and so no claim is made here that it ought to be valorized over other research methods. Yet the use of the virtual sphere as an aid to capitalization and as a means of communicating to shareholders ensures that doing social research online is now a valuable approach for apprehending the A-IC. This is also partly because the internet has become the means for storing and communicating data. A specific focus upon how the internet may have changed aspects of corporate-customer relations and helped enable new modes of capitalization in this sector is important but beyond the scope of this paper.

Whilst this subject is arguably less amenable to other well discussed virtual methods such as virtual ethnography (Hine, 2000), the virtual domain is, as I shall illustrate, an obvious space for sourcing data, deconstructing representations, and creating maps related to the A-IC. Whilst in many senses I only scratch the surface here, I touch upon four modes of the virtual that are of use. Firstly I want to highlight the rather obvious case of the corporate web-site. Although clearly a rather managed 'text' the corporate web-site however can provide important data on how LGCs construct animals, how they operate and who they are

networked with. Figure 1 illustrates a screenshot from the web-site of Genus plc, the world's largest LGC, outlining its global operation which includes sales in over 70 countries and corporate locations in 30 countries. Like several of the larger LGCs Genus plc is a multi-species corporation focussing on bovine (ABS Global) and porcine (PIC) genetics. Its web-site includes a wealth of data mostly in the form of annual reports and detailed information on its 'product ranges'.



**Figure 1 – Screenshot from the web-site of Genus plc**

This and other web-sites provide discursive evidence for how LGCs construct their economic and social role and specifically of how animals and their genetics become transformed into commodities. Figure 2 shows an illustrative sample of a style common to LGC web-sites which illustrates the particular quantities and qualities of their animal commodities, advertised to attract potential buyers. Whilst occasionally the language used to describe

animals is uncanny in its subjectification (see Twine, 2010a: 110-11), for the most part it is starkly instrumental to the extent that it could, I think, give people who consume animal products, pause for thought. The visual politics of the way animals are represented on LGC web-sites also merits scholarly attention. Here the animals are strikingly clean, appearing alone as if occupying significant space. This representation of clean animality seems far removed from the risky, dirty and confined environment of the factory farm. In this way the web-site as it necessarily exposes in a controlled manner elements of networks of the A-IC also simultaneously contributes to the veiling over of the violence of the complex.



Figure 2 – LGC web-sites featuring samples of ‘product ranges’

A second mode and a valuable source of data useful here in attempting to understand LGCs is to approach corporate patent portfolios. Although there is diversity between LGCs in the extent to which they take out patents that relate, for example, to techniques, genetic markers or actual animals, this data nevertheless represents a way to analyze the research interests and possible future trajectories of a given LGC. Information from each patent also brings into

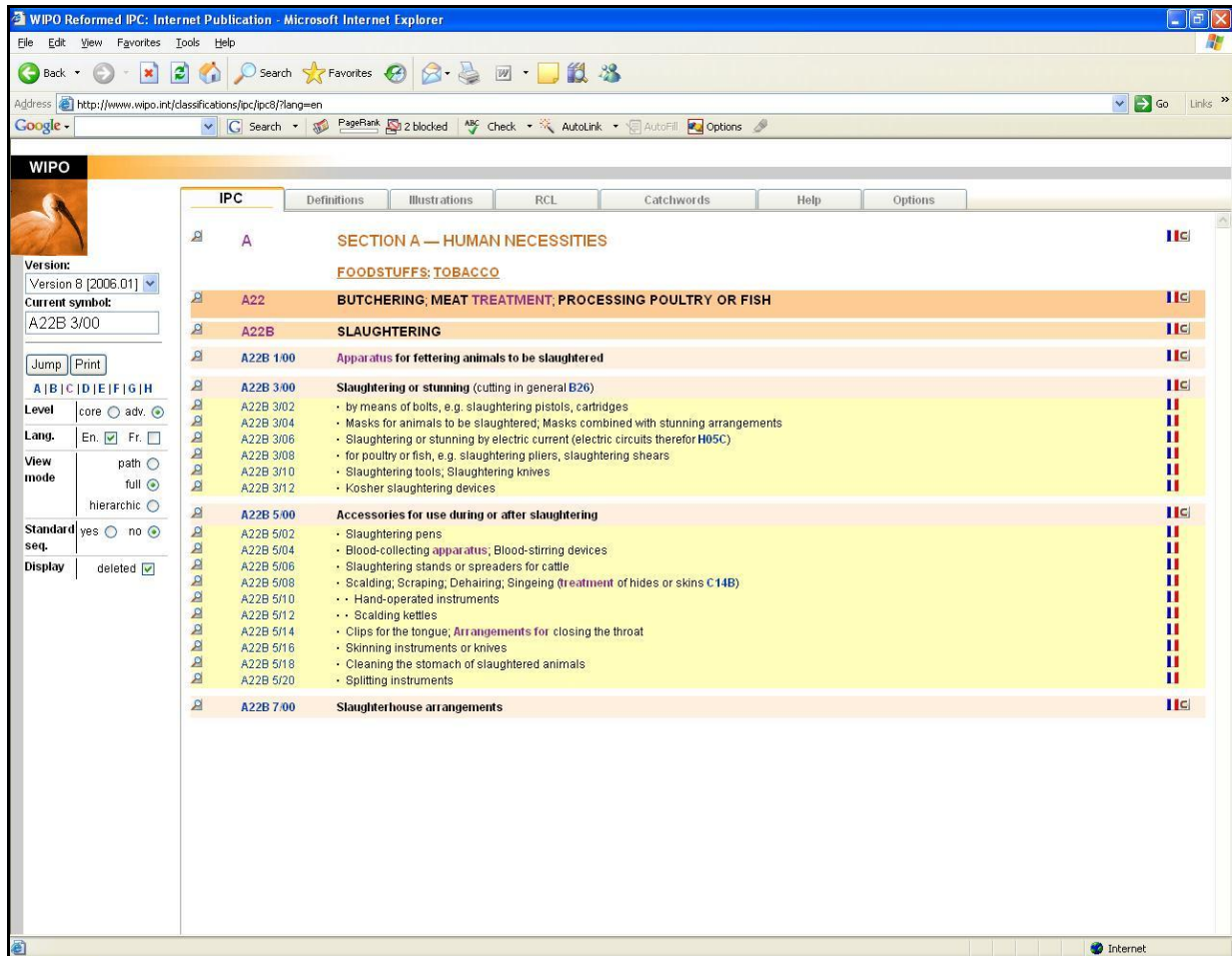
view individual scientists and how a given company may be linked in with specific, for example academic, networks. In trying to chart the intellectual property terrain of LGCs I have used the Aureka database by Thomson Reuters<sup>20</sup>. This allows for specific searches by corporation or by inventor. It also allows for forward and backward citation searches which are especially useful in order to map out ‘patent families’; where patents have come from, and how and who have since used them. Figure 3 shows patents owned by the Pig Improvement Company (PIC), part of Genus plc. Without even further trawling each patent for further data the list already tells us that PIC/Genus plc have had a close working relationship with animal scientists working at Iowa State University, and that they now hold several patents for genetic markers related to breeding more productive pigs. This is methodologically useful also because it begins to give us a sense of what individual people working for such companies actually do and how they do it.

Document ID	Title	Assignee	Inventor	Pub Date	App Date
EP1492805B1	SYSTEM FOR TRACING ANIMAL PRODUCTS	Pig Improvement Company UK Limited	PLASTOW, Graham S., Sygen International	2010-03-24	2003-04-08
US7371521B2	Methods	Pig Improvement Company UK Limited	Andersson, Leif	2008-05-13	2004-07-28
US7285385B2	Methods for analyzing animal products	Pig Improvement Company UK Limited	Andersson, Leif	2007-10-23	2004-01-18
US7229784B2	System for tracing animal products	Pig Improvement Company (UK) Ltd.	Plastow, Graham S.	2007-08-12	2003-04-08
EP1492805A4	SYSTEM FOR TRACING ANIMAL PRODUCTS	PIG IMPROVEMENT COMPANY UK LTD	PLASTOW GRAHAM S	2007-05-02	2003-04-08
EP1381698B1	METHOD TO ANALYSE THE KIT GENOTYPE OF PIGS	Pig Improvement Company UK Limited	ANDERSSON, Leif, Melica HB	2007-03-21	2002-04-24
WO2006099055A3	SEQUENCE, POLYMORPHISM, AND MARKER TEST TECHNOLOGY FOR DISEASE RESISTANCE AND GR...	IOWA STATE UNIVERSITY RESEARCH FOUNDATION...	TUGGLE, Christopher, K.	2007-03-08	2008-03-09
US20070002395A1	APPROACHES TO IDENTIFYING GENETIC TRAITS IN ANIMALS	IOWA STATE UNIVERSITY RESEARCH FOUNDATION...	Rothschild, Max F.	2007-01-04	2008-08-24
EP1613727A4	APPROACHES TO IDENTIFYING GENETIC TRAITS IN ANIMALS	UNIV IOWA STATE RES FOUND INC	ROTHSCHILD MAX F	2008-11-15	2004-03-11
WO2006099055A2	SEQUENCE, POLYMORPHISM, AND MARKER TEST TECHNOLOGY FOR DISEASE RESISTANCE AND GR...	IOWA STATE UNIVERSITY RESEARCH FOUNDATION...	TUGGLE, Christopher, K.	2008-08-21	2008-03-09
EP1581043A4	METHODS FOR SELECTION FOR EFFICIENT ANIMAL GROWTH	PIG IMPROVEMENT COMPANY UK LTD	GALINA-PANTOJA, L	2008-08-09	2003-08-20
US7081335B2	Prolactin receptor gene as a genetic marker for increased litter size in animals	Iowa State University Research Foundation, Inc.	Rothschild, Max F.	2008-07-25	2001-07-08
US7078928B2	Genetic markers for improved disease resistance in animals (BP)	Iowa State University Research Foundation, Inc.	Tuggle, Christopher K.	2008-07-04	2002-05-31
EP1613727A2	APPROACHES TO IDENTIFYING GENETIC TRAITS IN ANIMALS	Iowa State University, Research Foundation, Inc.	ROTHSCHILD, Max F.	2008-01-11	2004-03-11
EP1581043A2	METHODS FOR SELECTION FOR EFFICIENT ANIMAL GROWTH	Pig Improvement Company UK Limited	GALINA-PANTOJA, L., Sygen International/PIC USA	2005-10-05	2003-08-20
WO2004000009A3	METHODS FOR SELECTION FOR EFFICIENT ANIMAL GROWTH	PIG IMPROVEMENT COMPANY UK LIMITED	GALINA-PANTOJA, Lucia	2005-08-11	2003-08-20
EP1397511A4	GENETIC MARKERS FOR IMPROVED DISEASE RESISTANCE IN ANIMALS (BP)	IOWA STATE UNIVERSITY RES FOUND	TUGGLE CHRISTOPHER K	2005-04-20	2002-05-31
EP1425414A4	GENETIC MARKERS FOR IMPROVED DISEASE RESISTANCE IN ANIMALS (NRAMP1)	UNIV IOWA STATE RES FOUND INC	TUGGLE CHRISTOPHER K	2005-04-13	2002-05-31
US20050058123A1	Methods for analyzing animal products	PIG IMPROVEMENT COMPANY UK LIMITED	Andersson, Leif	2005-03-17	2004-01-16
EP1492805A2	SYSTEM FOR TRACING ANIMAL PRODUCTS	Pig Improvement Company UK Limited	PLASTOW, Graham S., Sygen International	2005-01-05	2003-04-08
EP1481415A2	FILTRATION SYSTEM	Pig Improvement Company UK Limited	VAN DER STEEN, Hein, c/o PIC Group	2004-09-29	2002-08-18
EP1425414A2	GENETIC MARKERS FOR IMPROVED DISEASE RESISTANCE IN ANIMALS (NRAMP1)	Iowa State University, Research Foundation, Inc.	TUGGLE, Christopher, K.	2004-08-09	2002-05-31
WO2002102989A3	FILTRATION SYSTEM	PIG IMPROVEMENT COMPANY UK LIMITED	VAN DER STEEN, Hein	2004-05-21	2002-08-18
EP1418271A1	METHOD OF SCREENING PIGS FOR RESISTANCE TO SALMONELLOSIS	Pig Improvement Company UK Ltd	KREUKNET, Marjke	2004-05-19	2002-07-30
WO2002097058A3	GENETIC MARKERS FOR IMPROVED DISEASE RESISTANCE IN ANIMALS (NRAMP1)	IOWA STATE UNIVERSITY RESEARCH FOUNDATION...	TUGGLE, Christopher, K.	2004-04-08	2002-05-31
WO20003887785A3	SYSTEM FOR TRACING ANIMAL PRODUCTS	PIG IMPROVEMENT COMPANY UK LTD.	PLASTOW, Graham S.	2004-04-01	2003-04-08
EP1397511A1	GENETIC MARKERS FOR IMPROVED DISEASE RESISTANCE IN ANIMALS (BP)	Iowa State University, Research Foundation, Inc.	TUGGLE, Christopher, K.	2004-03-17	2002-05-31
EP1381698A2	METHOD TO ANALYSE THE KIT GENOTYPE OF PIGS	Pig Improvement Company UK Limited	ANDERSSON, Leif, Melica HB	2004-01-21	2002-04-24
WO2004000009A2	METHODS FOR SELECTION FOR EFFICIENT ANIMAL GROWTH	PIG IMPROVEMENT COMPANY UK LIMITED	GALINA-PANTOJA, Lucia	2003-12-31	2003-08-20
WO20003887785A2	SYSTEM FOR TRACING ANIMAL PRODUCTS	PIG IMPROVEMENT COMPANY UK LTD.	PLASTOW, Graham S.	2003-10-23	2003-04-08
EP1354081A2	NOVEL PRKAG3 ALLELES AND USE OF THE SAME AS GENETIC MARKERS FOR REPRODUCTIVE AND ME...	Iowa State University, Research Foundation, Inc.	ROTHSCHILD, Max, F.	2003-10-22	2001-09-10
WO2003012138A1	METHOD OF SCREENING PIGS FOR RESISTANCE TO SALMONELLOSIS	PIG IMPROVEMENT COMPANY UK LTD	KREUKNET, Marjke	2003-02-13	2002-07-30
EP1272030A1	METHODS FOR SEXING NON-HUMAN MAMMALS	Pig Improvement Company UK Limited	MILEHAM, Alan PIC Group	2003-01-08	2000-11-03
WO2002102989A2	SYSTEM	PIG IMPROVEMENT COMPANY UK LIMITED	STEEN, Hein van der	2002-12-27	2002-08-18
WO2002097058A2	GENETIC MARKERS FOR IMPROVED DISEASE RESISTANCE IN ANIMALS (NRAMP1)	IOWA STATE UNIVERSITY RESEARCH FOUNDATION...	TUGGLE, Christopher, K.	2002-12-05	2002-05-31
WO20002097138A1	GENETIC MARKERS FOR IMPROVED DISEASE RESISTANCE IN ANIMALS (BP)	IOWA STATE UNIVERSITY RESEARCH FOUNDATION...	TUGGLE, Christopher, K.	2002-12-05	2002-05-31
US6291174B1	DNA markers for pig litter size	Pig Improvement Company UK Limited	Li, Ning	2001-09-18	1999-08-10
EP983387A1	METHODS FOR ANALYZING ANIMAL PRODUCTS	Pig Improvement Company UK Limited	ANDERSSON, Leif	2000-03-08	1998-05-27
WO1999037189A2	PROCESS FOR MAKING A PORK PRODUCT AND PORK PRODUCT MADE THEREFROM	PIG IMPROVEMENT COMPANY UK LIMITED	STADLER, John, A.	1999-07-29	1999-01-21
WO1998054389A1	METHODS FOR ANALYZING ANIMAL PRODUCTS	PIG IMPROVEMENT COMPANY UK LIMITED	ANDERSSON, Leif	1998-12-03	1998-05-27

Figure 3 – Patents from the Pig Improvement Company (PIC), part of Genus plc

An alternative way in which to use the patent system to yield data about the A-IC is to recall that it also functions as a catalogued library of innovation. So instead of searching by inventor or corporation one can search by subject matter<sup>21</sup>. Indeed, as may be noted in Figure 4, it is revealing that innovations around the slaughtering of animals are classified under ‘human necessities’ and pertain to the whole array of devices used to restrain, kill and

‘process’ the animal. Delving in to this and other sections of the catalogue provides a valuable method whereby different dimensions of the A-IC may be researched. Indeed given that patent data stretches back to the nineteenth century (for example the Aureka database holds data from 1836 onwards) this is an especially valuable research tool for any historical analysis of the emergence of the complex.



**Figure 4 – Sub-section of the Patent Catalogue: Slaughtering**

The third virtual mode I wish to note as a valuable means by which to garner data about LGCs and the A-IC generally is the use of Google Scholar. This database captures the vast majority of scholarly publications. If a particular piece of research conducted by scientists working for, or in collaboration with, LGCs is published then it can be picked up by a simple search. Moreover since LGCs act as funders to various animal science departments around the world, the authors of a publication will typically acknowledge the funder within their paper which then can be picked up by a search. Once again this is an especially useful way to reveal the sort of research particular LGCs are engaged in. As Figure 5 illustrates, a search

on the PIC yields a database of 815 documents (including journal articles and patents) for further analysis.

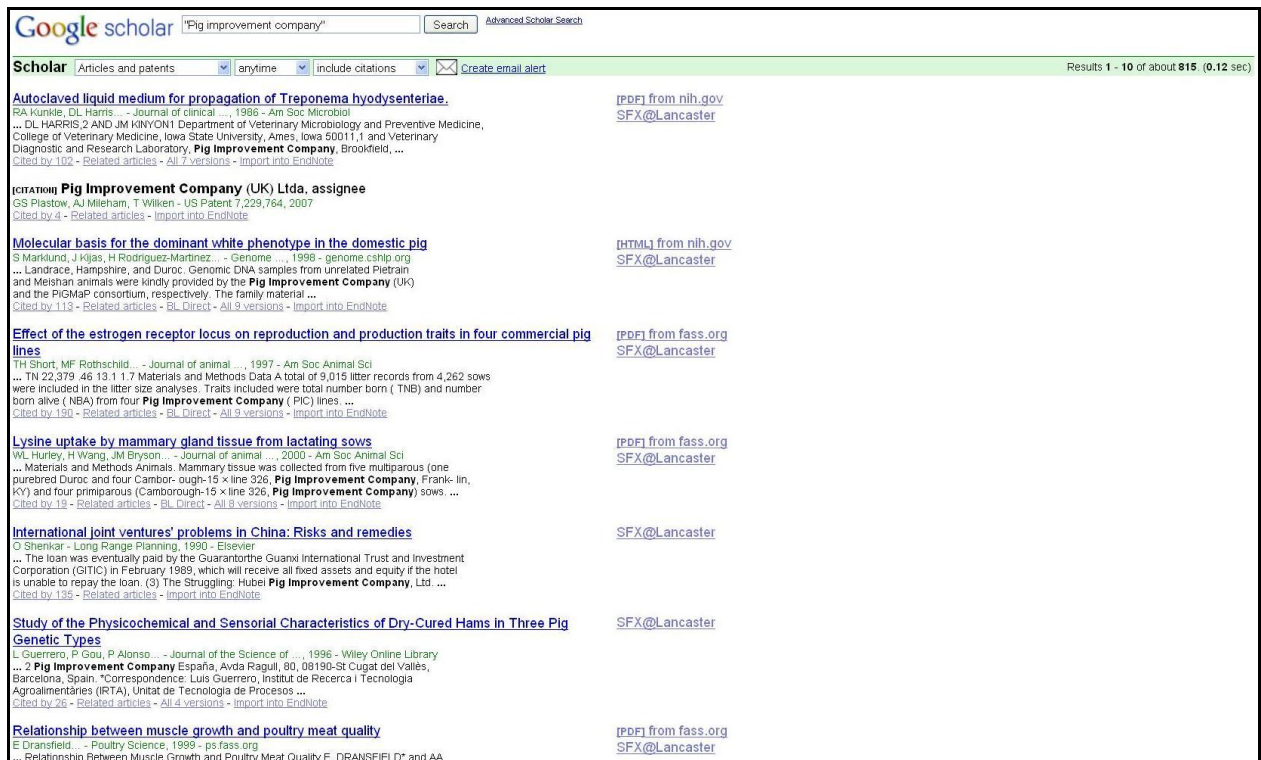
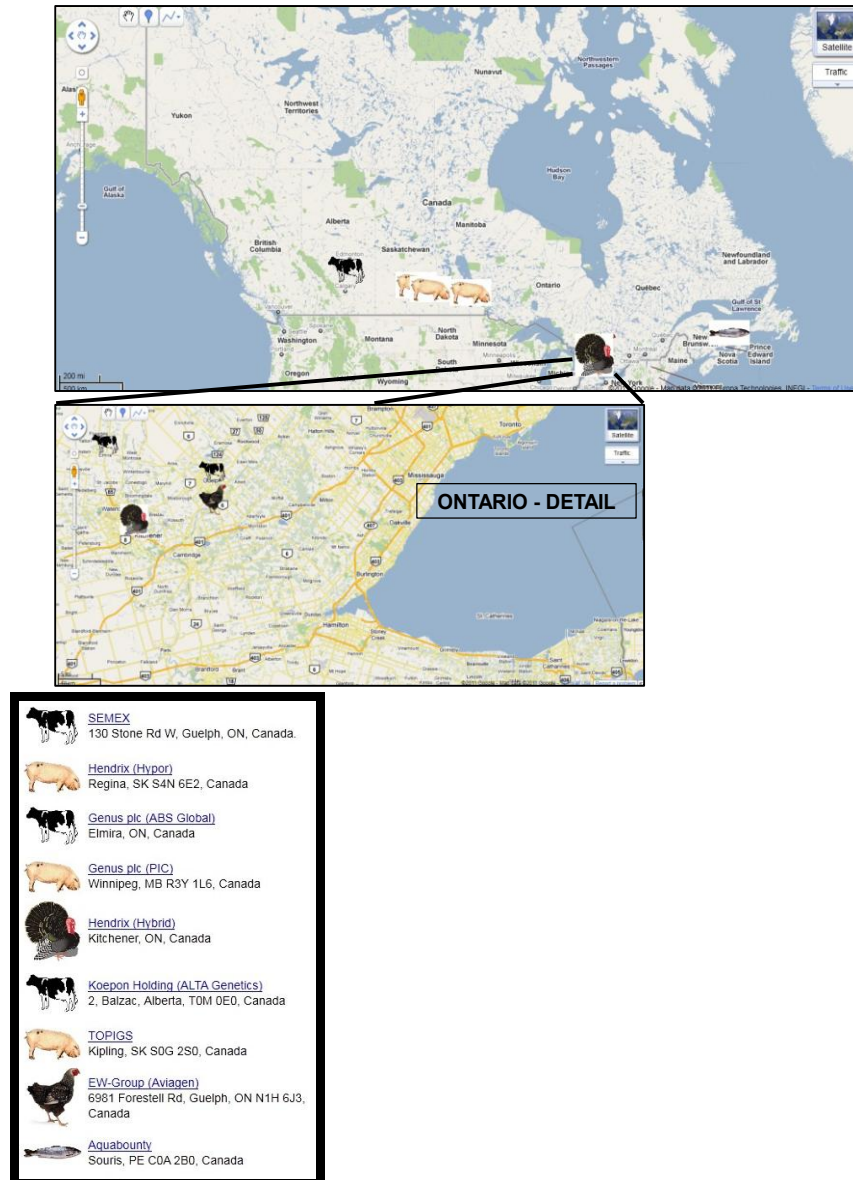


Figure 5 – Illustrating the use of Google Scholar to search for LGC associated research

The fourth and final mode also enrolls Google in the form of exploiting its mapping software<sup>22</sup>. Within Google maps it is possible to create annotated maps and to plot locations, directions and routes. Usefully for research purposes there is also a collaborate feature allowing more than one person access in order to work on or simply view the map. This is arguably specifically of use to researching the A-IC since this tool can bring into spatial visibility various dimensions of the complex. Here I wish to argue that this simple method can act to counter the social and affective invisibility of LGCs from everyday life. It is possible to envisage a complex layered up use of this method to render visible multiple connecting layers of the A-IC that would emphasize the prosaic proximity of the contemporary violence enacted upon farmed animals in our local, regional and transnational geographies. Figure 6 shows locations of selected Livestock Genetics Corporations (LGCs) in Canada<sup>23</sup>. Location data was obtained from company web-sites. A map such as that shown in figure 6 brings into relief some of the important infrastructure for the A-IC and hints at questions primed for further research. For example, why does there seem to be a concentration of LGCs in Ontario? Is there an historical, social and economic significance to

the presence of specific species related LGCs in various geographical areas of Canada? Are these locations shaped in part by their proximity to academic animal science departments? How have their operations been influenced by trends for vertical and horizontal integration within the LGC sector? Moreover, how are they connected to a) other actors in the A-IC?, and b) to other global locations of the same or that of partner corporations?



**Figure 6 – Locations of Selected Livestock Genetics Corporations (LGCs) in Canada**

The various ways of working in virtual space I have outlined provide points of empirical potential that should be of interest to people working in Critical Animal Studies and are accessible to those outside of the academy. Whilst acknowledging that methods are in an important sense performative (Law, 2004: 56), in that they partly construct the reality they

purport to present, social research here is notable for in the case of the A-IC they make a reality that previously, in a sense for many people, due to hegemonic affective investments in veiling and denial, did not in fact exist. I have case studied one small sector (LGCs) of one dimension (the meat/dairy industry) of the A-IC. This can serve to point CAS scholars in the direction of more specificity with regards to this case study and to pique interest in how these or similar methods could be employed to explore other dimensions of the A-IC.

In this paper I have intended to begin a crafting of the concept of the ‘animal-industrial complex’, to pick up where Barbara Noske’s initial birthing came to a premature end. I have sought to give the concept more definition and I have begun to explore the questions that must be considered in order to make the A-IC truly heuristic for CAS. This effort should also be situated within the wider context of attempts to outline the conceptual and methodological terrain for the future of critical animal studies (CAS). The approach here has been to explore how the A-IC relates to other ‘industrial-complex’ concepts, to consider three meanings of the word ‘complex’ as a means to better define the A-IC and to argue that CAS scholars when considering the complex should better situate their work within pre-existing social science research around, for example, global dimensions of food and agriculture. This latter point is further stressed as a means to allow CAS to travel into new inter/disciplinary spaces to argue its relevance to the academic mainstream.

Using LGCs as a case study in this paper similarly speaks to the relevance of the contemporary importance of critically addressing the animal-industrial complex; not merely to a small set of critically minded scholars but underlining that this reflexivity is now vital to the entirety of humanity. LGCs play a role in promoting the contemporary ‘livestock revolution’ and all that entails in terms of carbon emissions and violence against all animals alike<sup>24</sup>. Given that business-as-usual carbon intensive social practices entail highly probable environmental disaster, and that the ‘livestock revolution’ significantly exceeds business-as-usual levels of production and consumption it represents an exceptional case for intervention, change and mitigation. Bringing the animal-industrial complex back into scholarly and social consciousness and conscience helps make this case. Critical Animal Studies stands then as a crucial contemporary form of knowledge production that argues this case by contesting persistent norms of the ‘human’ and the ethical and spatial invisibility of the ‘animal’.

## Acknowledgements

I would like to thank the five anonymous reviewers for their helpful comments. The support of the UK's Economic and Social Research Council (ESRC) is gratefully acknowledged. The work was part of the programme of the ESRC Centre for Economic and Social Aspects of Genomics (Cesagen).

## Notes

<sup>1</sup> The word 'livestock' is clearly from within a frame of thinking that thoroughly naturalizes the commodification of animals. I therefore prefer not to use it but choose to on a few occasions to critically address the particular discourse of the 'livestock revolution' and self-titled 'livestock genetics companies'. My use of scare quotes around this word is intended to indicate a critical distance from the assumptions of this word. In this paper I have also decided non-ideally to use the word 'animal/s' instead of 'nonhuman animals' which I have used before. Both are problematic and I think that eventually CAS must challenge the discourse and binary of 'human and 'animal' in more satisfactory ways.

<sup>2</sup> To clarify, capitalist biopolitics do typically operate via an assumption of human/animal hierarchy, but collectively resource humans and animals alike for capitalization often in the same places and at the same times (for example, farm workers and farmed animals, slaughterhouse workers and farmed animals).

<sup>3</sup> The notion of intersectionality has various histories and was originally a humanist concept born out of a concern to better understand the intersections of classed, raced, and gendered power relations. Obviously here I intend it also in a more-than-human sense (see Twine, 2010b).

<sup>4</sup> I write here through the lens of a sociologist, albeit one who is sympathetic to post-disciplinarity, mindful of the interdisciplinarity of critical animal studies and sensitive to the status and needs of non-academic researchers.

<sup>5</sup> It has around 50 hits on Google Scholar which are mostly citations of Noske, or of the article by Carol J Adams, "'Mad Cow" Disease and the Animal Industrial Complex: An Ecofeminist Analysis' (1997).

<sup>6</sup> Please see the forthcoming (2012) special issue of JCAS on 'Prison and Critical Animal Studies'.

<sup>7</sup> For the distinction between 'medicalization' and 'pharmaceuticalization' see (Abraham, 2010).

<sup>8</sup> See Pollan's New York Times article here, <http://www.newmedia29.com/wrt105/vegetable-industrial.pdf>

<sup>9</sup> A good example here would be to ask whether the production and consumption of palm oil is actually vegan given its intersection with the killing of orang-utan populations, see [http://news.bbc.co.uk/panorama/hi/front\\_page/newsid\\_8523000/8523999.stm](http://news.bbc.co.uk/panorama/hi/front_page/newsid_8523000/8523999.stm)

<sup>10</sup> I thank an anonymous reviewer for pointing out also the use of the concept of agri- or agricultural industrial complex. According to Google Scholar there are 112 uses of agri-industrial complex and 166 uses of agricultural-industrial complex. Whilst space restricts me from an analysis of how this has

been used it would be an excellent and worthwhile follow up project to map out the extent to which these terms occlude or include questions of the animal.

<sup>11</sup> Of course the rise of vegetarianism and veganism could also be read in terms of the 'civilizing process' thesis. However if such practices were read as a banishment of 'animality' from the 'human' this view would be based on a false conflation of the animal with carnivorous practices. The civilizing process theory of Elias is not wholly separate from Foucauldian theories around the transition from sovereign to biopower and how they pertain to the visibility of violence (e.g. see Foucault, 1976, 1977).

<sup>12</sup> Bauman was speaking here in terms of the relationship between forms of rationality and the WWII holocaust. Thus war and colonialism are also major dimensions of Janus-faced modernity. We can note a comparable management of violence in the operations of the military-industrial complex. Whilst most media report the violence of war very few show it in its graphic, potentially disruptive, detail. In this sense it is also sequestered.

<sup>13</sup> In a subsequent paper I will focus in more detail on this third meaning of complex: the affective and social-psychological dimensions of the animal-industrial complex.

<sup>14</sup> There is no intention to imply that no CAS or animal studies scholars have yet to engage with these approaches.

<sup>15</sup> For a critical appraisal of the commodity chain approach and its variations please see Jackson et al (2006).

<sup>16</sup> Of course there is a danger in ANT that in the granting of agency to animals that they become either conflated with non-sentient objects, or remain homogenized as 'animals', in contrast to the 'human'. Although ANT is certainly interested in ontological posthumanism, it is, like Marxist political economy, far from the *political* posthumanism insisted by CAS. For a short list of early ANT works that discuss animals, see <http://www.lancs.ac.uk/fass/centres/css/ant/ant.htm#ani> For a review of some criticisms of ANT see (Murdoch, 2001).

<sup>17</sup> Visibility however does not guarantee politicization or changes in practices. Jovian Parry has convincingly argued that strands of the 'New Carnivore' movement, as expressed in various media (especially television), revel in a new visibility of animal slaughter that is bound up in particular reassertions of gender norms (Parry, 2010). This, I think, is further fuel for exploring the psychological and affective dimensions of the A-IC.

<sup>18</sup> For a more detailed analysis of LGCs see (Twine, 2010a; and especially Gura, 2008).

<sup>19</sup> See <http://anonymous.org.il/art731.html> Moreover several states in the US have witnessed recent (so far failed) attempts at so-called Ag-Gag legislation whereby it would be deemed illegal for animal activists to obtain video footage from factory farms or slaughterhouses. These attempts illustrate well the tension between secrecy and visibility in the A-IC. For more information on Ag-Gag legislation see <http://opinionator.blogs.nytimes.com/2011/04/26/who-protects-the-animals/>

A recent animal cruelty case in a UK slaughterhouse did not (to date) result in prosecution because the video footage was deemed to have been obtained illegally (see <http://www.food.gov.uk/news/newsarchive/2011/jul/chealmeats>). One positive outcome of this has been that the UK's Department for Environment, Food and Rural Affairs (DEFRA) who originally refused to prosecute the slaughterhouse owners have now been stripped of their powers of prosecution. Animal Aid had argued that DEFRA were too close to industry and thus could not be deemed impartial. Finally Animal Aid has long campaigned for UK slaughterhouses to be equipped with CCTV. This campaign has recently met with success and major UK supermarkets have been enrolled to demand that the slaughterhouses they use have CCTV. This raises many issues around the

visibility/secretcy nexus. Moreover is this merely a biopolitical disciplining of slaughterhouse workers rather than any sort of meaningful systemic challenge? Is it a classically 'welfarist' reform that might placate the majority of people who may have cruelty concerns but have no interest in changing their practices?

<sup>20</sup> Access to this database requires a paid license. However there are several freely available Patent Databases, for example, Google Patents, see <http://www.google.co.uk/patents>

<sup>21</sup> For more on the classification system, see <http://www.wipo.int/ipcpub/#refresh=page>

<sup>22</sup> This software is free and requires a Gmail account. It is located at <http://maps.google.com/>

<sup>23</sup> The choice of Canada is close to arbitrary. However a previous version of this paper was presented at the ICAS sponsored 'Thinking about Animals' Conference, Brock University, Ontario, Canada, March 31st/April 1st, 2011.

<sup>24</sup> Corporate and state promotion of the over/consumption of animal products can be conceptualized, I think, as a form of material and cultural violence against humans as well.

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