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John Law's Aircraft Stories – An Application of Actor-Network Theory

Beginning in the 1980's, Sociologist and scholar of science and technology studies John Law, together with Bruno Latour and Michael Callon, developed a new approach to social theory, one that envisaged science, technology, and society, existing not as separate social spheres, but all together in complex system of relational networks. This became known as Actor-Network Theory (ANT), which fundamentally redressed the relationships between human and non human actors, or more simply, the social relations of 'objects'. Through the development of this new methodological approach to social theory, John Law wrote *Aircraft Stories: Decentering the Object in Technoscience* (2002), which is an ethnographic case study into a British attempt to build a military aircraft, the TSR2. Law's ethnographic exploration thus presents a broad and diverse range of intertwined "stories" regarding this particular aircraft, and aims to demonstrate how particular objects can be understood within a myriad of complex contexts, and are part of a vast system of relational 'rhizomatic' networks. This essay will be an investigation into John Law's ethnography *Aircraft Stories*, and through an exploration into the fundamentals of ANT, will critically examine how Actor-Network Theory appears within this work. To do this, this investigation will be presented in two halves. First will be an analysis of ANT so that a conceptual framework can be established as a point of reference for the second part, where an examination of Law's *Aircraft Stories* will be presented, and thus assess how ANT appears within this ethnography.

To begin this investigation into *Aircraft Stories*, first an exploration into the methodology of Actor-Network Theory is important to help create a contextual framework in which to examine how this theory appears within this particular ethnography. Actor-Network Theory (ANT) is a distinct approach to social theory that was developed out of the 1980's, frequently being credited to three writers; Bruno Latour, Michael Callon, and John Law (Cressman, 2009, pp.1-6). Coming from the discipline of Science, Technology and Society (STS), ANT was conceived as a new way to understand the sociology of science and technology, in particular, scientific and technological innovation (Law and Singleton, 2015, pp.4-5). Latour (1999), contended that ANT should in fact not be thought of primarily as a theory, rather an approach or 'tool-kit' for thinking about and understanding the social order of things, in particular, for comprehending 'practices of association' (Law and Singleton, 2015, pp.3-5). In a paper regarding ANT, multiplicity, and policy, John Law and Vicky Singleton (2015) argue that when applied correctly, ANT serves as a 'critical sensibility', both analytically and politically, that redresses assumptions about the relations of the social and the natural, and the social and political (Law and Singleton, 2015, pp.3-4). Importantly, Law & Singleton (2015) explain that the term 'actor network theory' is itself owed to its co-creator Michael Callon, who's endeavours to explore and understand unsuccessful technological innovations, in this case a French attempt at an electric vehicle, led him to show how technological projects were a complex mess of people, theories, concepts, science, policies and politics, that were often chaotic and unpredictable, frequently having unintended outcomes (Law and Singleton, 2015, p.4). Indeed, this led Callon to structure an investigation into how these relational complexities should be understood, and what this new way of charting social relations should be called. Callon thus theorised about the sociology of an 'Actor-Network' [Actor-Network Theory],

which Law and Singleton (2015) describe as a new way of addressing the juxtaposition of a social actor simultaneously being a relational network. This new approach effectively dismantled the traditional social divisions between agency and structure, or more simply, between the human and non-human material worlds (Law and Singleton, 2015, p.4).

A crucial aspect of ANT, and one that will be returned to when exploring Law's *Aircraft Stories* (2002), is explained by Darryl Cressman (2009), who describes how the unique approach of ANT offers a detailed look at how science and technology are created and thus interact with society. Indeed, before ANT moved beyond its own origins in STS and became a widely accepted and applicable theory of the social world (Cressman, 2009, p.2), the original intention of ANT's approach was to investigate the 'history and sociology of science' (Latour, 2003, p.35). This particular aim is achieved by micro examining the social spheres of where science and technology often emanate, being: laboratories, scientific institutes, governments agencies, funding bodies, and boardrooms (Cressman, 2009, pp.2-5). The 'actors' within these spheres are then traced, which establishes the relational networks surrounding science and technologies. However, the sheer size and number of actors in any given network in this respect becomes problematic, as 'actors' can emerge and then disappear before a network can be recognised. Because of this, ANT focusses on the fundamental network 'builders' as primary actors to follow, and it is through which interpretations of the network process are thus established (ibid). This approach of ANT is what allows it to trace the relational networks of science and technology that exist between governments, politics, funding, technologies, knowledge, and people. As these areas are the key connections that result in science and technology coming into being, through their examination descriptions can be generated that can be

used to explain why science and technology exists the way that it does (ibid). If focus was not placed in these key areas, then tracing network relations becomes prosaic.

Cressman (2009) stresses that one of the qualities of ANT is through this unique approach to investigating relational networks. It is the paradox of the 'actor-network' that is the key to its ability to investigate new relational complexities. The importance of fundamentally redressing conventional dualist notions of the division between agency and structure is what allows ANT to introduce completely new contexts to relational networks (Cressman, 2009, pp.3-5). Here, if everything becomes an actor-network, in being both a social-actor and a network simultaneously, then it is neither reducible to existing as an actor alone, nor as a network. This process is what forms the basis to establish 'heterogeneous' networks comprising of both the human and material worlds, in which agency is granted to all things. Conceptually, the actor-network is what allows ANT to consider both human and non-human elements as equal actors, and thus social agents, within a network (Cressman, 2009, pp.3-5). As Latour (1996) explains, an 'actor' in ANT is a wholly semiotic definition, as an actor can exist as anything that acts or can grant activity to another. Therefore, an actor only exists only in relation to other actors (Latour, 1996, p.373). Importantly, this is how both human and non human actors can be understood within the same 'heterogeneous network', as they are defined by their interaction with other actors and their inherent social agency. Here, the 'heterogeneous network' overcomes the duality between humans and non humans, binding all actors together (Cressman, 2009, pp.3-5).

An important distinction is made by Cressman (2009) regarding the conceptualisation of the network through ANT, which makes it distinct from conventional sociological notions of

the concept. The network in ANT is not principally concerned with tracing interactions between individuals within a network, rather the way the *actors* are utilised as *social agents*. This happens by ANT studying 'associations' between heterogeneous actors, or as Latour (1999) described, 'practices of association'. These may be associations that succeed or fail, that are proposed or attempted, but are merely associations (Cressman, 2009, p.4). In doing this, ANT is explicit in rejecting any linear models of tracing networks, as such would imply that relational networks were bound in a determinism that would suggest systematic structures, such as a start, beginning, and an end, are inherent to them (ibid). Law and Singleton (2015) make a similar statement when discussing the relationality of ANT, suggesting that the matter of association must be studied in all its material forms. In order to understand something accurately, all avenues of associations must be explored. Here, even exploring the generally acknowledged 'start' of a project is inherently heterogeneous, as so many more associations can be traced depending on the multitudes of contexts and perceptions that exist (Law and Singleton, 2015, pp.6-7). Here, one could approach a project from multiple perspectives, such as politically or technically, and find completely different contexts for relational networks. Hence, the 'start' of something is merely figurative. Law's contention here is that all aspects of knowledge, subjects, and importantly, objects, are 'fractionally coherent', being relationally drawn together whilst remaining centerless. Law would describe this non-linear modelling, and consequently, non-linear relational networks as being 'rhizomatic', or networks that extend 'in every direction' (Law, 2002, pp.1,5). This introduction of mutliplicity into ANT, renders it decentralised, and inherently non-linear.

Now that a conceptual framework into the fundamentals of ANT has been presented, this investigation can move on to its second phase, where the application of ANT through Law's *Aircraft Stories* will now be examined. *Aircraft Stories: Decentering the Object in Technoscience* (2002) is fundamentally a case study of a technological project that began development in the 1950's by the British post-war government, to build a supersonic, nuclear capable, multi-role tactical strike and reconnaissance aircraft, named the TSR2. Ultimately, the project was controversially cancelled in 1964 by a change in government and at great financial cost. Law's book thus offers an assemblage of 'stories' regarding the failed TSR2 project, that draw on a wide range of approaches and perspectives to highlight how technological projects can be comprehended in a multiple contexts, and challenges modernist and postmodernist epistemology. It is pertinent to state here that Law's *Aircraft Stories* is not an overt and direct application of ANT to the TSR2 project, but does heavily utilise, extrapolate, and expand the key themes of ANT inline with how Law himself viewed ANT developing since the 1980's (Law and Singleton, 2015, p.4).

Indeed, as Law himself writes in *Aircraft Stories*, in 1985 he began a direct actor-network based study of the TSR2 in an attempt to add the failed technical project to other similar actor-network based studies of technical projects, such as Latour's work on French pasteurisation (1988) and Callon's work on a French attempt at an electric vehicle (1986). Law aimed to show through ANT how all aspects of technical projects are 'malleable', specifically that the social aspects were just as malleable as the technical through 'heterogeneous engineering', bringing the technical, social, and political together (Law, 2002, pp.54-55). However, as Law continued with this actor-network based case study, he felt increasingly uneasy about his own relationship with the aircraft, and in particular, with

its high-status spokespersons (ibid). Law discovered that as his interviewees knew nothing of ANT and the intentions of his study, the political intentions of the spokespersons for the aircraft conflicted with his goal of the project exemplifying ANT. Law was increasingly being seen as the person to write the 'definitive history' of the aircraft, and more troublingly, what lessons might be learned from the failed project that could be applied to future military projects (ibid). By 1989, Law had a near completed actor-network based case study on the TSR2, however this was shelved indefinitely due to the irreconcilable conflicts Law could no longer negotiate. As Donald MacKenzie (2003) describes, what Law has produced since through writing *Aircraft Stories*, is a case study quite unlike the other actor-network based studies from the 1980's (MacKenzie, 2003, pp.884-885).

Aircraft Stories then, offers a much broader theoretical approach to tackling the TSR2 project than the initial 'heterogeneous' approach of ANT in the 1980's (Law and Singleton, 2015, p.4). It draws from wider cultural and philosophical theory, and is permeated with Law's own reflections on his subjectivity and reasoning for his approach to writing about the TSR2 as a technical project (MacKenzie, 2003, pp.884-885). What is evident throughout however, is that Law's recount of the TSR2 project is heavily influenced by his development of ANT, as will be shown with reference to the theoretical framework that has been presented in the first part of this essay. Law's work in *Aircraft Stories* then, presents a collection of decentered stories about the attempted TSR2 project, the structure of which echo's Law's position that all things are 'fractionally coherent' (Law, 2002, pp.1,5), reflecting the general non-linear approach of ANT. Ostensibly, the book tackles the epistemological problem of the 'object' in sociological terms, and offers readers multiple perspectives to the technological project of the TSR2, structured in a way that conveys

Law's critical and alternative approach to modernist and postmodernist conceptions of knowledge. This is done through presenting many different views of the TSR2, that oscillate between both the singularity of the aircraft as an object and its contextual multiplicity, constituting the 'stories' regarding the aircraft.

Many, if not all, of these stories are only brief glimpses of the aircraft, which serve to articulate several of Law's points well. In structuring the stories of the book in this way, Law deploys and acknowledges several deliberate metaphors on how the book is written and the 'performativity' of his written approaches. In doing so, Law reinforces his rejection of the narratives he perceives in modernist and postmodernist approaches to epistemology, whilst also conveying his own contention that the book should be a performance on 'fractional ways of knowing' (Law, 2002, pp.4-5), which as has been shown earlier, reflects one of the key distinctions of the approach of ANT. Indeed, a key theme of *Aircraft Stories* is to highlight Law's particular ANT based approach to epistemology in critical contrast to modernist and postmodernist alternatives. Law's decentered, fractionally coherent methodology is contrasted throughout the book between the modernist epistemology of centered and structured processes, and the postmodernist rejection of all narratives with everything being centerless and unconnected. Law then, likens the 'fractionality' of his method regarding these stories as one of a 'pinboard', which presents a disjointed juxtaposition of photographs, fragments of brochures, notes, stories, histories, technical specifications, and so on. This strengthens Law's objection to impose coherence or structure to his writings, insisting that rhizomatic networks extend in every direction, as acknowledged by Law himself in the introduction (Law, 2002, pp.5-6). This however, hasn't escaped criticism. Writing about Law's attempt to construct an alternative narrative, Eric

Schatzberg (2004) scrutinises Law's decentered approach in *Aircraft Stories*, claiming that in fact, Law is making a very ordered 'pinboard' regardless, as his book contains introductory and concluding chapters that offer summaries and indeed coherence to a piece of work intended to prove the opposite (Schatzberg, 2004, p.407). Schatzberg takes this further and criticises Law for his writing being 'an extended exercise in postmodernist theory', and has very little to say to 'historians of technology' (Schatzberg, 2004, pp.406-407). In fact, much of Schatzberg's criticism of Law stems from the fact that *Aircraft Stories* has little to offer scholars of technology as it is in fact not even a theoretical work about technology, as would be expected from a case study about a specific technological project (ibid). Schatzberg goes on to note that Law failed to acknowledge a similar piece of work written by Latour, a colleague and co-developer of ANT, who produced a very similar account of a failed technological project, entitled *Aramis* (1993). Schatzberg laments the fact that Latour's *Aramis* has little to no mention in Law's *Aircraft Stories*, and claims that Latour is much more successful in *Aramis* than Law in *Aircraft Stories*, at creating an alternative narrative through ANT about technical projects (Schatzberg, 2004, p.411).

Perhaps this criticism is a little unfair, as *Aircraft Stories* has conceivably more to say about the development of a particular epistemological approach than of technical projects. Looking back to the theoretical framework, as Cressman (2009) previously described, it is the uniqueness of ANT's approach that offers new contexts and perspectives on how science and technology interact with society (Cressman, 2009, p.2), and with this in mind, Cressman's point is certainly evident throughout *Aircraft Stories*. Additionally, as Law has stated in later writings commenting on ANT, and echoing similar comments made by Latour, that ANT itself should be thought of less as a theory and more of a way at looking

at the social order of things. Law and Singleton make the case that ANT has in fact been a project itself, admittedly however, one that has come at the price of becoming its own 'intellectual orthodoxy' (Law and Singleton, 2015, p.4). Nevertheless, Actor-Network Theory has not remained static, and has been constantly developed since the 1980's. The initial position of ANT being fundamentally that of heterogeneous relational networks has been refined to include the concepts of multiplicity and fractionality, and in successor projects, performativity, and how these lead to possibilities and impossibilities within networks (ibid). All of these concepts appear throughout *Aircraft Stories*, and have been used to successful effect by Law in his goal of demonstrating complexity of social relations of technological projects. Indeed, perhaps the most intriguing and convincing aspect of *Aircraft Stories* is acknowledged by Cyrus C. M. Mody, noting how Law builds his ethnographic case study by putting forward a relational network of his own, one that utilises reflexivity of the self, subjectivity, and different perceptions and contexts to really build upon the fabric of ANT. Law presents himself through his own multiplicity, as a student, as a father, as an author, and as a sociologist, presenting the reader with a first hand account of the point of his work, the fractionality and multiplicity of contexts (Mody, 2004, p.117).

To bring this investigation to its conclusion, the above exploration into *Aircraft Stories* highlights how the theoretical approach of Actor-Network Theory appears throughout John Law's ethnographic study of the TSR2. Although self admittedly not a full actor-network based case study, as Law describes how his own attempt at an actor-network study of the TSR2 ended in failure, what has been presented through *Aircraft Stories* is a development of ANT by Law, and offers a much broader approach to understanding the social relations

of technical projects, whilst maintaining and utilising much of the fabric of ANT to make its point. Law's use of a disjointed 'pinboard' approach to presenting stories about the TSR2 aircraft demonstrates rhizomatic networks, and reflects the decentered non-linear modelling that is a unique trait of ANT. Furthermore, Law's use of his own subjectivity and reflexivity shows the multiplicity of contexts in which an object can be viewed, illustrating another characteristic of ANT. Overall, although ANT directly is seldom the primary focus of *Aircraft Stories*, the theoretical approach that Law presents in tackling the technological project of the TSR2 heavily draws from the foundations of Actor-Network Theory, the fundamentals of which appear prominently throughout this ethnography.

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