Engaging a Complex World:
Modelling, Heterogeneity and Geographical Praxis

by
John Douglas Milton
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submitted by
John Douglas Milton, B.A. (Hons.)

in partial fulfillment of the
requirements for the degree of Masters of Arts

Fiona Mackenzie, Thesis Supervisor

Simon Dalby, Chair
Department of Geography and Environmental Studies

Carleton University
September 2002

Abstract

This thesis seeks to situate Actor-Network Theory in current geographical praxis. Actor-Network Theory sees the world as consisting of a myriad of dynamic networks of human and other life-forms, and physical, technical, and intellectual actants. It approaches social and spatial questions from within existing networks, contending that both the causes of and possible answers to social problems can be discovered in already existing actor-networks.

Actor-Network Theory is considered theoretically as part of a broader examination of the history of modelling in geography. It is then examined in a concrete sense through an examination of globalised agri-food. In this latter undertaking, the understanding gained through Actor-Network Theory of globalised agri-food is compared to that derived from a structuralist modelling approach employing Regulation Theory and from an application of Foucaultian methodology.

It is concluded that it offers geographers an exciting approach for examining social and spatial questions. However, it is also emphasized that Actor-Network Theory does not replace other forms of modelling.

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Introduction

This thesis is about modelling and the potential place of Actor-Network Theory in geographical praxis. Actor-Network Theory is relatively new to geography, appearing in the literature only in the past decade. Its origins, however, can be traced back to the late 1970s and early 1980s in the works of such scholars as Bruno Latour, Michel Callon and John Law. At that time, Actor-Network Theory was being applied to studies in sociology and more specifically, the sociology of scientific knowledge. Since then, Actor-Network Theory has been applied to a wide range of questions including those of technology development and transfer, patents and intellectual property, and health studies as well as analyses of the capitalist marketplace, financial networks and agri-food networks.

Proponents of Actor-Network Theory see the world as consisting of a myriad of dynamic networks composed of human and non-human life, as well as physical, technical, and intellectual constituents. They embrace a heterogeneous world that is perceived as both the source and the outcome of these networks. What makes Actor-Network Theory different from forms of systems analysis is that it does not privilege humans as the sole organising actors of a network, instead acknowledging that physical, technological and even intellectual actants can, and do, transform people as well.

In seeking to situate Actor-Network Theory in geographical praxis, this thesis necessarily begins with an examination of the nature of knowledge and the role of modelling in the manufacturing of knowledge. Admittedly, this inquiry traverses some vast terrain, seeking to situate forms of modelling within Foucault's *epistemes* and Kuhn's paradigms. This exploration subsequently leads to a consideration of the foundationalism of modernity, heterogeneity, genealogy, Foucaultian power and ethnography. Each of these is worthy of more detailed examination than given in this thesis. The purpose herein is a more modest one, seeking simply to assemble the intellectual framework in which knowledge is determined to be knowledge, and in which certain forms of modelling have become relevant over time. Part one closes with a more detailed examination of Actor-Network Theory and its potential application by geographers in engaging a heterogeneous world.

In part two, three approaches to understanding globalised agri-food will be explored as a case study: the first approach, structuralist in nature, will examine the dynamics of globalised agri-food from the perspective of Regulation Theory; the second utilizes Foucaultian power; and the third, Actor-Network Theory. Whereas there exists an extensive body of literature which draws upon Regulation Theory to analyse globalised agri-food, little has been written on agri-food and agri-food issues utilizing either Foucault or Actor-Network Theory. For this reason, the two chapters, five and six, using these latter approaches must be seen as sketches, revealing, it is hoped, simply the differing understandings of globalised agri-food offered by such theoretical vantage points.

The purpose of this thesis is not to dismiss any specific mode of modelling. The essential goal will be to identify what differences in understanding emerge from these three vantage points through both theoretical musings of part one and the case study of globalised agri-food in part two. It is hoped that the comparison presented in part two will reveal what elements of globalised agri-food are privileged by the differing forms of modelling, what elements are omitted, and what understanding of globalised agri-food is derived from each.

In part three, the insights gained from the theoretical musings of part one and the case study presented in part two will be consolidated into a brief essay on the potential of Actor-Network Theory in geographical praxis. In so doing, I wish to raise the fundamental question ‘What is the purpose of modelling?’ as opposed to ‘Why do we model?’ If the purpose of modelling is to gain an understanding of reality, then we must acknowledge the heterogeneous nature of that reality and develop approaches capable of engaging such a reality. It is suggested that Actor-Network Theory is one such approach.

Although Actor-Network Theory is relatively new to geography, it will be argued that this theory offers geographers another exciting approach to social and spatial questions, adopting an ethnographic sensibility to academic investigations. Because of its ethnographic bent, most studies applying Actor-Network Theory opt to concentrate on specific networks rather than more macro-level themes. This is because, to proponents of Actor-Network Theory, both the causes of social problems and possible answers to these problems are seen as already existing within the actor-networks that constitute the social order of a society.

Situating myself and this work

Although my interest in Actor-Network Theory is a relatively recent one, my interest in the nature of modelling dates back nearly two decades. Having spent more than twenty years working in the agri-food sector, both as a civil servant in the federal government and as a consultant specialising in agri-food regulation, I have been struck by the importance of modelling in decision-making. Models, and the knowledge generated through models, often provide the basis upon which crucial political, economic, cultural and social decisions are made. However, despite this important role, we often fail to question the nature of these models and the potential biases these contain. Why is it that we privilege certain forms of modelling? Why is it that we come to consider certain variables as crucial elements to include in a particular model while other variables are not? And, perhaps most important of all, why do we place so much importance on the knowledge derived from models? These questions are particularly relevant today as modern forms of enquiry, due to their foundational nature, are increasingly met with skepticism. It is hoped that this work can help stimulate such discussions.

Part I

Models, Systems and Actor-Network Theory

“Geography is the study of relations between society and the natural environment. Geography looks at how society shapes, alters, and increasingly transforms the natural environment, creating humanized forms from stretches of pristine nature, and then sedimenting layers of socialization one within the other, one on top of the other, until a complex natural-social landscape results. Geography also looks at how nature conditions society, in some original sense of creating the people and raw materials which social forces “work up” into culture, and in an ongoing sense of placing limits and offering material potentials for social processes like economic development.” (Peet 1999:1-2)

In an effort to gain an understanding of reality we necessarily create frameworks, models and systems which, by their nature, simplify or abstract the complexities inherent in that reality. Geography is no different from other disciplines in this respect. Most students of geography have, at one time or another, been schooled in the central role of modelling within their discipline as a means of gaining knowledge of the world through the study of Richard Peet’s sets of relations. What constitutes modelling, and knowledge itself, has however changed throughout the history of Western thought and must necessarily be considered in the context of the period in which these are conceived.

How knowledge comes to be knowledge is a complex question. In part one of this thesis, I seek to consider the nature of modelling in the history of geography and suggest a place for Actor-Network Theory in current geographical praxis. This undertaking

necessarily begins with a consideration of the meaning, understanding and manufacturing of knowledge. This, in turn, raises questions associated with a society's frame of meaning within which knowledge is defined, as examined principally through Foucault's understanding of a society's *episteme*. The discussion will then turn to the fragmentation of Western knowledge into disciplines and the role of Kuhn's paradigms in organising a discipline's praxis.

Building upon these thoughts, I will turn to three approaches to geographical praxis and the methods and techniques associated with each as adopted by geographers to formulate geographical knowledge. The first of these interpretations will concentrate on what I will term 'modern' geography or Enlightenment-inspired geography, suggesting that it shares the basic foundationalism of much of Western modern thought and, in so doing, the modern quest for knowledge of the underlying ordering of reality. The second interpretation will concentrate on Foucault's notions of power/ knowledge, genealogy and *dispositif*, and how these influence geographical praxis. The third interpretation will focus on an ethnographic approach to understanding the heterogeneous nature of reality, culminating with a discussion on Actor-Network Theory as providing the means through which this heterogeneous world can be engaged without imposing foundational assumptions onto it.

Chapter 1. Modelling in a Complex World: Frameworks of Meaning

Each individual is born into a world of knowledge in a sense similar to Heidegger's *being-in-the-world*, drawing upon existing *stocks of knowledge* in "the production of their life and the reproduction or transformation of the forms of life of social groups (their own and other), and ultimately of society" (Thrift 1996:97). This "social" knowledge, organized and maintained by a society, is recursive in nature and is "the result of practices that both provide the medium for and the outcome of social structure" (Thrift 1996:97; cf. Giddens 1976, 1979, 1981; Elias 1978, 1982; Bhaskar 1979, 1980; Abrams 1982). As such, these stocks of social knowledge must be seen as being historically and geographically specific, and as being socially constituted (Thrift 1996).

Nigel Thrift divides a society's *stocks of knowledge* into four types of knowledge: (a) *unconscious knowledge*, or knowledge that is based upon forgotten practices (suggesting in so doing a form of "histo-geographic psychology"); (b) *practical knowledge*, informal in its nature and learnt from experience and practice, and thus seen as being unarticulated, continuous or repetitive, local and based upon organic analogy or metaphor; (c) *empirical knowledge*, formal in nature and organized systematically within a society and which, "like practical knowledge, is bent towards the mastery of the conditions of existence, but ... exercised within a learning process which is not only

cumulative but systematized and co-ordinated over large tracts of space and over longer time-horizons” (Thrift 1996:103); and (d) *natural philosophy*, which seeks to unify knowledge into a single, coherent structure.

Thrift goes on to suggest that a society’s *stocks of knowledge*, or what is accepted as known and true, represents only a small portion of potential knowledge, situating what is known in the context of five kinds of unknowing: (a) knowledge that is simply unknown in that specific time and place, or a particular epoch; (b) knowledge that is not understood because it does not fall within a society’s existing frame of meaning; (c) knowledge which is taken-for-granted and therefore not discussed; (d) knowledge that is actively and consciously hidden from either society as a whole or various social groups within a society; and (e) unknowing that results from distortion or active manipulation of knowledge.

The knowledge contained in these social stocks is therefore complex and potentially contradictory in nature. Furthermore, the scope of knowledge contained in these stocks must be seen as being in constant turmoil as new knowledge is accepted and incorporated into a society’s stocks while other knowledge is either shifted from one form to another form of knowledge or is discarded altogether (Thrift 1996).

In his essay, *Flies and Germs: A Geography of Knowledge*, Thrift (1996 [1985]) is principally interested in social knowing and not the production, distribution and circulation of knowledge. He is interested in what knowledge is available to individuals within a society, concluding that within every society there is a social distribution of knowledge based upon the social group structuration of that society. Nevertheless, his

discussion of the nature of social knowledge is equally relevant when considering the production of knowledge since this, too, takes place within the same social setting.

What comes to be acknowledged as knowledge emerges through social processes, or, as scholars concerned more specifically with the sociology of scientific knowledge (SSK) would argue, as being socially manufactured (Barnes 1972, 1982; Mulkay 1979; Barnes & Shapin 1979; Latour & Woolgar 1979; Yearly 1984; Woolgar 1988; Latour 1993; Law 1994; Shapin 1995).

1.1 Enframing the world: *epistemes* and *dispositifs*

What is generally accepted as knowledge is dependent upon what Vidal de la Blache termed a given society's "*genre de vie*;" Wittgenstein, a society's "forms of life;" Dilthey, a society's "worldview;" Gadamer, a society's "horizon;" Foucault, a society's "*episteme*;" and, most recently, Roebuck a society's "framework." Each of these ideas argues that every society contains an essential set of co-ordinates or frame of meaning into which individuals, both as individuals and collectively as a society, organize experience and come to define what constitutes knowledge. Vidal de la Blache, writing at the beginning of the twentieth century, considered a people's *genre de vie*, consisting of what David Livingstone describes as "an integrated web of physical, social and psychological threads" (Livingstone 1992:267), as providing the essential framework of understanding for that society. Writing on the eve of the twenty first century, Paul Roebuck incorporates a broader set of active processes reflected in language and forms of life into what he terms a society's "framework":

“People use frameworks of feeling and understanding to define the world, its organization, processes and direction. These constructions define how people judge their lives and determine how full or empty their lives are. Frameworks are our sources of identity – what Charles Taylor (1989) calls ‘the sources of the self.’ At different times in history and in different places in the world, frameworks have been based on such things as the belief in an hierarchical chain of being in the universe, the call of God made clear in revelation, the guidance of dreams obtained on a spirit quest, or the space of glory in the memory and song of the tribe.” (Roebuck 1999:21-22)

Michel Foucault, in his earlier writings, defines a society’s frame of meaning as its *episteme*. This, Foucault wrote, consists of “the total set of relations that unite, at a given period, the discursive practices that give rise to epistemological figures, sciences and possibly formalized systems” (Foucault 1972:191). It includes a society’s values, norms and sources of meaning that he describes as being both part of, and the product of, a society’s conceptual and cultural constructions. An *episteme* is therefore “something like a world-view, a slice of history common to all branches of knowledge, which imposes on each other the same norms and postulates, a general stage of reason, a certain structure of thought that the men of a particular period cannot escape” (Foucault 1972:191) and as such,

“the episteme is not a form of knowledge (*connaissance*) or type of rationality which, crossing the boundaries of the most varied sciences, manifests the sovereign unity of a subject, a spirit, or a period; it is the totality of relations that can be discovered, for a given period, between the sciences, when one analyses them at the level of discursive regularities.” (Foucault 1972:191)

Thus, as Dan Clayton summarizes, an *episteme* combines “a culture’s conception of *order* (how connections between words and things are made), *signs* (how knowledge is construed), and especially *language* (how truths are formulated from linguistic signs)” (Clayton 2000a:225). Both the linking of order, signs and language, and the situating of an *episteme* temporally were crucial to Foucault.

An *episteme* is therefore the discursive framework of meaning of a society within which knowledge comes to be. It does not, however, consist simply of questions of epistemology, or how knowledge is attainable, but also necessarily reflects questions of metaphysics, or what we believe can be/to be knowable. Such intellectual frameworks not only involve a relationship between a knower and a known, between a subject and an object but necessarily presupposes some metaphysical understanding of the nature of the universe and what constitutes this universe.

While various epistemological approaches and differing ontological positions have been raised at various times in Western history since the Ancient Greeks, not all have come to provide the philosophical foundations of a specific *episteme* or associated epoch. In *The Archaeology of Knowledge* (1972 [1969]) Foucault suggests that there have been only three *epistemes* in Western history: a *Renaissance episteme* ([pre-] sixteenth century) wherein the organizing principle of knowledge was resemblance; a *Classical episteme*, (mid-seventeenth century to the late eighteenth century) wherein the organising principle of knowledge was representation and during which time attempts were made “to construct a universal method of analysis which would yield perfect certainty by ordering representations and signs to mirror the ordering of the world” (Peet 1998:119); and a *Modern episteme* (nineteenth century to the mid-twentieth century) wherein knowledge was characterized as relational and in which the idea of ‘man’ as both an object of and subject of knowledge was conceived. Foucault went on to envision the imminent death of ‘man’ as the focal point of understanding as constituting the next epistemic rupture in Western thought.

Seen in this historical context, the dominant framework in which knowledge is conceived in Western thought has shifted from a static, passive view of knowledge based on resemblance through representational knowledge to a more dynamic and active view of relational knowledge. Whereas the *Renaissance episteme* drew upon the works of Plato and Aristotle, stressing the absolute, permanent character of an external universe and consequently envisioning an absolute, permanent knowledge, the *Modern episteme* has adopted a more relational, even constructivist, understanding of knowledge and an epistemological approach to knowledge underwritten by the Kantian synthesis of empiricism and rationalism.

In his later writings, Foucault would expand upon these ideas, coming to see knowledge as being inextricably tied to power and how it is exercised within a society. To Foucault, truth “is linked in circular relation with systems of power which produce and sustain it, and to the effects of power which it induces and extends” (Dreyfus and Rabinow 1983:120). In Foucault’s (1980c:131) words,

“Truth is a thing of this world: it is produced only by virtue of multiple forms of constraint. And it induces regular effects of power. Each society has its régime of truth, its ‘general politics’ of truth: that is, the types of discourse which it accepts, and makes function as true; the mechanisms and instances which enable one to distinguish true and false statements, the means by which each is sanctioned; the techniques and procedures accorded value in the acquisition of truth; the status of those who are charged with saying what counts as true.”

This linkage of knowledge and power led Foucault to enlarge the framework within which knowledge is formed and maintained, extending this beyond that of an *episteme* to include social structures and power itself. This he came to term a *dispositif*, including within it a wide range of non-discursive practices, institutions, regulations, laws,

administrative measures, scientific statements, philosophic propositions and morality through which knowledge is institutionalized (Dreyfus and Rabinow 1983:120). In so doing, Foucault came to consider not only how knowledge comes to be discursively, but how it is created and maintained through structures and institutions of a society.

A society's *dispositif* is dependent upon Foucault's genealogical approach that focuses on the "historical reconstructions of the relations between power, knowledge and the human subject [and] that aspires to be an immanent critique of the present" (Clayton 2000b:291). This will be dealt with in greater detail in chapter two. What is important to this discussion is the essential enlarging of a society's framework from the discursive framework of an *episteme* to the more complex framework of a *dispositif* that includes those processes of power within a society and the nature of its institutions through which knowledge and truth are created and, most importantly, maintained.

Truth to Foucault is therefore to be understood as being subjective in its nature. Tim Unwin (1992:27) observes that Foucault becomes ultimately concerned with the "political economy of truth" since Foucaultian truth is dependent upon the organization of power in the society (Foucault 1980c:131). To Foucault, "truth," as constituted within modernity, is characterized by five traits:

"'Truth' is centred on the form of scientific discourse and the institutions which produce it; it is subject to constant economic and political incitement (the demand for truth as much for economic production as for political power); it is the object, under diverse forms, of immense diffusion and consumption (circulating through apparatuses of education and information whose extent is relatively broad in the social body, notwithstanding certain strict limitations); it is produced and transmitted under the control, dominant if not exclusive, of a few great political and economic apparatuses (university, army, writing, media); lastly, it is the issue of a whole political debate and social confrontation ('ideological' struggles)." (Foucault 1980c:131-132)

Pausing for the moment to apply these ideas to Thrift's *stocks of knowledge*, it is possible to organize a society's *stocks of knowledge* into a dominant or hegemonic set of stocks institutionalized by those having power and sets of stocks marginalised by those same holders of power. These marginalised stocks consist not only of knowledge that is discounted within a society or located in the subaltern; it includes what Foucault terms subjugated knowledge. Subjugated knowledge are understood as historical knowledge that have been masked by the "functionalist or systematizing thought" (Foucault 1980b:82). "Subjugated knowledge," Foucault writes, "are thus those blocs of historical knowledge which were present but disguised within the body of functionalist and systematizing theory and which criticism – which obviously draws upon scholarship – have been able to reveal" (Foucault 1980b:82). This body of knowledge, as revealed through his genealogical method, includes "a whole set of knowledge that have been disqualified as inadequate to their task or insufficiently elaborated: naive knowledge, located low down on the hierarchy, beneath the required level of cognition or scientificity" (Foucault 1980b:82).

Foucault does have his critics. Johnston (1996) raises two criticisms concerning a *episteme*: first, that Foucault's historical classification of European civilization into three *epistemes* seemingly denies the possibility of other systems of thought operating during these periods; and second, Foucault's failure to explain how one *episteme* is replaced by another. Claval (1981) raises a third concern, accusing Foucault of being arbitrary in his selection of the life sciences, linguistics and political economy in his historical analysis at the expense of other fields of knowledge which he suggests do not fit Foucault's analysis.

Focusing on Johnston's criticisms, it would be a mistake to conclude that, to Foucault, an *episteme* is the only frame of reference operating within a specific society in a specific period or epoch. Quite the opposite seems to be true. Foucault recognized early in his academic career (cf. *The Archaeology of Knowledge* 1972:x-xi and his consideration of the tension between the desire for homogeneity and the reality of heterogeneity in historical analyses) that every society is heterogenous in nature. He explored this heterogeneity in greater detail in his 1967 lecture published in English entitled *On Other Spaces* (Foucault 1986; Hetherington 1997). This lecture will be considered in more detail in chapter two.

Johnston's other criticism of Foucault – concerning how one *episteme* challenges and ultimately replaces another – deserves greater attention at this juncture. Johnston writes, quite correctly, that the idea of an *episteme*, as described by Foucault

“implies that a particular world-view (macro-paradigm?) predominates during a period and influences (controls?) the contents of individual discourses. Presumably, too, there must be periods of competition between *epistemes*. Foucault does not outline how such change occurs, however. One is left with the concept of discourses set in a societal matrix, but with little indication of how the nature of the matrix changes, presumably, in part through its interactions with those discourses.” (Johnston 1996:24)

Perhaps there is a good reason for this. Perhaps it is impossible to construct a model of such transitions due to the dynamic nature of these interactions within the societal matrix. Furthermore, although Foucault did not consider periods of competition, or upheaval, between competing *epistemes*, this does not mean that such periods are inconsistent with his thesis. One could, for example, argue that there have been two, and not three, *epistemes* in Western history – a *Classical episteme* (or what Foucault termed the *Renaissance episteme*), dating from the Ancient Greeks to the Medieval Period and

a *Modern episteme*, emerging during the Late Enlightenment Period and continuing to this day. In this interpretation, the late Renaissance and the Enlightenment Periods would constitute a period of competition between the established *Classical episteme* and the aspiring *Modern episteme*.

What is important to this study is the simple idea that a dominant or hegemonic structure of thought comes to form the *episteme* of a given society during a specific epoch and that this *episteme* becomes entrenched in that society's *dispositif*. At the same time, this hegemony does not imply the absence of competing frameworks within a specific society during a specific period of time or epoch. Debates over the nature of knowledge – what reality consists of and how we gain knowledge of this reality – have always existed in Western thought and continue to exist despite the ascendancy of the *Modern episteme*. New schools of philosophy have emerged in Western thought, particularly during the twentieth century, that offer – sometimes subtle and other times radical – ideas concerning the question of knowledge. However none have, as yet, gained a hegemonic status in society necessary to provide society with its overarching framework, or *episteme*. Returning for the moment to Foucault's idea of a *dispositif*, one might argue that this is due to the forces of power operating within society that continue to perpetuate the *Modern episteme* and marginalise alternate frameworks or worldviews.

Finally, it is also important to recognize that an *episteme* is neither absolute nor fixed in-itself. Gadamer perhaps states this openness best in his idea of a horizon which he describes as limiting and finite, but also open. He writes that the very idea of a closed horizon is a false abstraction:

“The closed horizon that is supposed to enclose a culture is an abstraction. The historical movement of human life consists in the fact that it is never utterly bound to any one standpoint, and hence can never have a truly closed horizon. The horizon is, rather, something into which we move and that moves with us. Horizons change for a person who is moving.” (Gadamer 1975:271)

Foucault’s *episteme* must be seen in a similar light, as both restrictive and yet dynamic, open and capable of absorbing, albeit to a limited degree, new ideas and approaches to knowledge. Here again, the diversity of philosophical traditions that have emerged and continue to thrive within what Foucault defined as the *Modern episteme* illustrates this inherent openness.

1.2 Understanding the world: disciplines and paradigms

If an *episteme* provides the fundamental discursive framework of understanding for human knowledge in a given period or epoch, and a *dispositif* expands this framework to include its institutional aspect, how then does knowledge come to be within the *Modern episteme/dispositif*, or more simply, within modernity? How is knowledge established within modernity? What does “the modern” understand to be knowable?

Most scholars see modernity as the offspring of the Enlightenment, championing the themes first articulated by Enlightenment thinkers. These themes are succinctly summarized by Shea and Huff as consisting of

“the rise of individual autonomy over traditional community, the rise of secularizing reason over inherited authority, the disengagement of nature from a supernatural worldview, the rise of methodical and institutionalized criticism, the rise of science as both technique and worldview, the rise of historical consciousness and the practice of historical method, and the establishment of bourgeois institutions and a democratic ethos in public life.” (Shea and Huff 1995:8)

These seven themes reflect the fundamental changes in both epistemological approaches and metaphysical understanding of reality which occurred during the late Renaissance

and the Enlightenment Periods and the extent to which these changes impacted on the European understanding of the physical world, of human society and of the self.

The revolution in European thought, commonly termed the “scientific revolution,” consisted of a series of changes in the structure of European thought including the introduction of systematic doubt and empirical/sensory verification, the fragmentation of knowledge into separate sciences or disciplines, and a mechanistic view of the world. During that same period, the European’s understanding of humanity and its place in the universe also underwent a fundamental transition. Whereas meaning was once understood to be in-the-world, or in the context of some cosmic order, meaning during the Enlightenment became increasingly subjective and human-centred. Roebuck observes that

“People came to define themselves no longer in relation to a cosmic order, but as subjects who possessed their own picture of the world within them, their own purposes and drives. With this new notion of subjectivity went an objectification of the world. The old view of the world as a cosmic order to which people were essentially related was replaced by a domain of neutral facts, mapped by tracing correlations and manipulated in fulfillment of human purposes.” (Roebuck 1999:22)

This disengagement of nature from a supernatural worldview, and the emergence of a mechanistic universe, as first suggested by Galileo and later fully expressed by Newton in his *Principia Mathematica*, proved to be a decisive moment in the formation of the *Modern episteme*. The universe in which humanity found itself had changed. Stripped of its theological hierarchy and the Great Order of Being, it became a neutral stage where humanity existed and God did not intercede. Mechanical in nature, the universe was seen as operating according to mathematical principles that could be understood by humanity. More importantly, it was not simply understandable but it was

predictable and, if it was predictable, it was manipulable. One no longer needed to turn to religious authorities or theological texts for explanation. Instead, it was possible to explain, or understand, the universe through the proper application of reason and diligent observation of phenomena. Order was therefore to be achieved through understanding; it was no longer defined by God, but by humanity. Again turning to Roebuck,

“With the conceptual revolution of the Renaissance and Enlightenment, the world was transformed from a meaningful order — a sign from God — to an inert, manipulable thing. Orderliness that the Greeks and their intellectual heirs took to be in the world, came to be thought of as orderliness in our minds that we project onto a contingent earth.” (Roebuck 1999:22)

In accordance with Enlightenment tradition, knowledge was to be extracted from reality through the application of reason based upon experience. The origin of this understanding of knowledge and method was located in the fledgling natural sciences of the period. Buoyed by dramatic advances in these fields, scholars applied this scientific methodology to social fields of study as well, including economics, history, politics and ethics. They reasoned that, if the universe could be understood and manipulated through understanding, so too could these other fields of human action be manipulated, and if this was possible, then humanity could create a better world – a utopia, a paradise, or perhaps even an Eden – without the assistance of God.

This was the dominant belief of many Enlightenment thinkers who argued that enlightenment and the realization of personal emancipation were attainable through the application of reason (Osborne 1999; Outram 1995; Porter 1990; Gay 1975). It was through the search for knowledge and the diligent application of reason that it was

possible to liberate both one's self from the bonds of a servitude defined by obedience to authority which characterized European Medievalism and for a society, collectively, to throw off the yoke of obedience to authority and actively engage in creating a better world. As Immanuel Kant wrote in 1783, during what historians have termed the Late Enlightenment, enlightenment represented

“Man's emergence from his self-imposed nonage. Nonage is the inability to use one's own understanding without another's guidance. This nonage is self-imposed if its cause lies not in lack of understanding but in indecision and lack of courage to use one's own mind without another's guidance. Dare to know! (*Sapere aude.*) ‘Have the courage to use your own understanding,’ is therefore the motto of the enlightenment.” (Gay 1973:384)

Enlightenment thus represented a fundamental break from the past. To Roy Porter, Kant's “enlightenment was man's final coming of age, the emancipation of the human consciousness from an immature state of ignorance and error” (Porter 1990:1), an emancipation that had, as its essential ingredients, critical reason, freedom and individualism. It represented a rebellion against hierarchical order and dogmatic thought, a rejection of “authority-as-truth” and the embracing of “truth-as-authority” (Osborne 1999).

Essential to the liberation of “Man” from nonage and the subsequent transformation of both society and the human self was the associated liberation of knowledge from what had become the straightjacket of scholasticism. In this new intellectual era, everything had to be questioned and understood. Writing some forty years before Kant, Jean le Rond d'Alembert referred to this underlying imperative in his introduction to the *Encyclopédie* that he co-edited with Denis Diderot. To d'Alembert,

“from the principles of the secular sciences to the foundations of religious revelation, from metaphysics to matters of taste, from music to morals, from the scholastic disputes of theologians to matters of trade, from the laws of princes to those of peoples, from natural law to the arbitrary laws of nations ... everything has been discussed and analyzed, or at least mentioned.” (quoted in Rosenberg 2001:48)

European thought turned away from the metaphysical absoluteness of Plato’s *Ideas* and *Forms* and increasingly towards what was perceived as the objective, neutral framework of the scientific method as the means to revealing knowledge of, and order to, the world. The *Encyclopédie* constituted a rational dictionary of knowledge. To Foucault, the *Encyclopédie* was an artifact of the time and its epistemological disposition to classify and tabulate, which either suppresses or ignores the dimension of time (Foucault 1973). The *Encyclopédie* consequently was “a real synchronic taxonomy of the world” (Foucault 1973:74).

Inquiries into the nature of knowledge became increasingly complex with the ascendancy of the Enlightenment ideals, the discoveries of the emerging natural sciences and the European engagement with the rest of the world through its self-proclaimed “Age of Discovery.” Yet, as the understanding of knowledge became more complex, so did the organization of the corresponding *stocks of knowledge*. Knowledge became fragmented, first into fields of study and, ultimately, into disciplines. As Porter (1990) notes, today’s social sciences — sociology, economics, psychology, anthropology and geography — all emerged from seeds sown in the Enlightenment Period. How knowledge is classified and organized today owes much to the organization of knowledge during the Enlightenment, and specifically the organization of knowledge in the *Encyclopédie*.

These fields of study, or disciplines, while operating within the broad framework of an *episteme*, formed their own academic communities and subsequently generated their own discourses. In so doing, these academic or scholarly communities have come to define not only the language of their discipline but also the scope of their discipline by generating “sets of mutually agreed rules which govern description and discussion among the members who agree to those rules” (Johnston 1996:23-24). Each community came to (and continues to) define what constituted the correct methods of research, the correct means of interpretation and the correct ways of presenting the results of research. Knowledge, therefore, is not simply the product of some neutral, objective process, but is the product of highly contested social environments where a discipline’s debates, deliberations and decisions are as important as are the findings or statements of knowledge themselves (Johnston 1996).

Sociology has traditionally approached the question of knowledge by asking how, and to what extent, social factors influence “products of the mind” (Shapin 1995:289). Proponents of the sociology of scientific knowledge (SSK) argue more forcefully that knowledge is socially manufactured and politically charged (Barnes 1972, 1985; Mulkay 1979; Barnes and Shapin 1979; Latour and Woolgar 1979; Yearly 1984; Woolgar 1988; Callon and Latour 1991; Latour 1993; Law 1994; Shapin 1995). Bruno Latour, in particular, repeatedly argued that there is as much, if not more, political intrigue within the confines of scientific workplaces (laboratories, etc.) as there exists outside, and that the credibility of a scientific claim is secured principally through a social and political process (Latour and Woolgar 1979; Latour 1987, 1999b).

The nature of scientific knowledge and how it becomes knowledge is, of course, the subject of Thomas Kuhn's watershed work, *The Structure of Scientific Revolutions* (1970 [1962]). To Kuhn, a scientific community must necessarily operate with some set of received beliefs. Kuhn terms such a set of beliefs a paradigm. Paradigms help scientific communities bound their discipline, guiding the community's research program and organising subject curriculum. These communities perpetuate themselves through the accepted protocols established by its paradigm. Education plays an important role in this process of socialization (Unwin 1992) but members also interact at conferences, publish in specific publications, draw upon each other's works in citations, all of which serve to reinforce the disciplinary structure (Mulkay 1975; Latour & Woolgar 1979; Johnston 1996).

To Kuhn, a paradigm is essential to a discipline. He writes that "no natural history can be interpreted in the absence of at least some implicit body of intertwined theoretical and methodological belief that permits selection, evaluation and criticism" (Kuhn 1970:16-17). It is within an accepted paradigm that normal science takes place, where normal science is defined as "research firmly based upon one or more past scientific achievements, achievements that some particular scientific community acknowledges for a time as supplying the foundation for its further practice" (Kuhn 1970:10). Normal science is thus seen as cumulative, building upon previous research within a paradigm that provides a research with three crucial sets of tools: "(1) an accepted body of knowledge, ordered and interpreted in a particular way; (2) an indication of the puzzles that remain to be solved; and (3) a set of procedures for puzzle-

solving” (Johnston 1996:14). In this sense a paradigm is a reflection of Foucault’s *dispositif*, operating at the disciplinary level, incorporating both discursive and non-discursive processes of power within the institutions of a discipline through which knowledge and truth are created and, most importantly, maintained.

However, paradigms are also characterized by an inherent tension. On the one hand, a paradigm must also be seen as open-ended, capable of absorbing, albeit to a limited degree, new ideas and approaches to knowledge. On the other hand, not all anomalies are successfully absorbed into the disciplinary paradigm, thereby becoming catalysts that lead to the articulation of alternate paradigms. While normal science does not seek radical, or “novelties of fact or theory,” new and unsuspected phenomena are repeatedly revealed by scientific research (Kuhn 1970:52). Such revelations can lead to an awareness of anomalies that challenge the integrity of a paradigm. Either the paradigm adjusts to incorporate, or absorb, these anomalies through a process Kuhn terms “conceptual assimilation” or their existence provides a catalyst for alternate paradigms to emerge. A paradigm, therefore, must maintain a delicate balance: the achievements upon which a paradigm is grounded must be both seen as truths by members of a community yet be sufficiently open-ended to encourage further research by posing the next problems to be addressed (cf. Barnes 1982).

This tension is further reinforced by the simple fact that, as was suggested as being the case for a society’s *episteme*, a paradigm must also be seen as only the dominant framework of a specific discipline. Other frameworks exist within a discipline and challenge this dominant framework. These exist because a paradigm does not, and

cannot, explain everything despite the process of “conceptual assimilation.” As Kuhn acknowledges, “to be accepted as a paradigm, a theory must seem better than its competitors, but it need not, and in fact never does, explain all the facts with which it is confronted” (Kuhn 1970:17-18). As is the case with society in general, a discipline is also populated by a community that is heterogeneous and capable of raising other possible frameworks within which that discipline can operate. There will always be those engaged in extraordinary research which is conducted outside the accepted paradigm of the discipline. The incomplete nature of a paradigm thus provides the vital space for alternate frameworks to operate, for non-mainstream ideas to circulate and for extraordinary research to take place.

The practice of a discipline changes through periodic revolutions which Kuhn sees as “non-cumulative developmental episodes in which an older paradigm is replaced in whole or in part by an incompatible new one” (Kuhn 1970:92). This emergence and ascendancy of a new paradigm ultimately leads to a shift in professional understanding and action. Kuhn thus sees the history of a discipline as characterized not by a steady progression wherein theory was added to theory until truth is ultimately ‘discovered,’ but rather as a series of revolutionary changes in scientific worldviews which have little in common with the previous. Science is not to be understood as a steady, cumulative acquisition of knowledge, but rather as “a series of peaceful interludes punctuated by intellectually violent revolutions” which are “tradition-shattering complements to the tradition-bound activity of normal science” (Kuhn 1970:6). The outcome of such a revolution is the replacement of one conceptual world by another.

It is important to keep in mind that Kuhn was writing about science and the nature of scientific knowledge and consequently, many of the critiques focused on questions surrounding scientific praxis and knowledge. Masterman (1970) points to the ambiguity of the term ‘paradigm,’ which she says Kuhn uses in no less than twenty-one different ways. Along with Masterman (1970), Lakatos (1978) and Mulkay (1978) argued that Kuhn’s scientific revolutions do not occur as rapidly as he suggested. Lakatos, for example, considers any research programme to contain an inherent tension between those tendencies that reinforce it and those that encourage its disintegration, and that the replacement of one such research programme by another involves a significant period of criticism and contest (Lakatos 1978; Unwin 1992), a process akin to what has already been suggested in the previous section for epistemic shifts.

Other critiques of Kuhn address the privileging of science as the principal generator of objective and neutral knowledge. The anarchist philosopher, Paul Feyerabend, argues that science is completely relative and, therefore, scientific knowledge is not cognitively superior to any other form of knowledge (Livingstone 1992). It should be seen as being simply another ideology to be questioned and challenged (Feyerabend 1975, 1978). Richard Rorty is equally critical of the idea of scientific knowledge’s neutrality and of science’s self-proclaimed authority. He argues that science, and the scientific tradition, simply constitutes a search for a vocabulary that is better at explaining or describing the world through which humanity can better predict and ultimately control that world. Science is, in effect, a word game, created by people and not something inherent in Nature. Rorty writes that “scientific breakthroughs are not so much a matter of deciding

which of various alternative hypotheses are true, but of finding the right jargon in which to frame hypotheses in the first place” (in Livingstone 1992:15). In his examination of Rorty, Livingstone concludes that,

“to Rorty, scientific method simply means having a good list of headings or vocabularies for tasks to be done – a good filing system. Scientific rationality, then, means obeying the conventions of your discipline, not fudging the data too much, and listening to your colleagues. It is what he calls ‘epistemic good manners’. It certainly isn’t Nature’s own language that is simply not a useful notion.” (Livingstone 1992:15)

1.3 Foundationalism and the *Modern episteme*

Modern knowledge is, therefore, established in disciplines and organized by paradigms that are, in turn, determined in large part by the *Modern episteme*. The challenging and usurping of one *episteme* with another, however, does not necessarily result in the wholesale substitution of one set of epistemological and metaphysical beliefs with another. While there occurred a fundamental shift in both epistemological approaches and metaphysical beliefs during the Renaissance and the Enlightenment Periods, that were to coalesce into the *Modern episteme*, there have remained two important ingredients to much of Western thought, traceable back through the Enlightenment and Medieval scholasticism to the Ancient Greeks – first, a belief in some underlying order to reality that is knowable, and second, a belief in progress towards a specified end, whether this end was spiritual salvation or some form of utopian society.

To Ernst Cassirer (1951) (see also Carl Becker in Wright 2001), Enlightenment thinkers simply shifted the focus of enquiry into the nature of reality, replacing an *esprit de système* with an *esprit systématique*. He writes

“In England and France, the Enlightenment begins by breaking down the older forms of philosophic knowledge, the metaphysical systems. It has lost faith in the ‘spirit of systems’; it sees in this spirit not so much the strength of, as an obstacle to, philosophic reason. But, in renouncing, and even in directly opposing, the ‘spirit of systems’ (*esprit de système*), the philosophy of the Enlightenment by no means gives up the ‘systematic spirit’ (*esprit systématique*); it aims rather to further this spirit in another and more efficient manner.” (Cassirer 1951:vii)

As already noted, Kant summarized this *esprit* in exclaiming, “*Sapere aude!* Dare to know,” which he viewed as the motto of the Enlightenment. Again, turning to Cassirer,

“The age senses that a new force is at work within it; but it is even more fascinated by the activity of this force than by the creations brought forth by that activity. It rejoices not only in results, but it inquires into, and attempts to explain, the form of the process leading to these results. . . . When the eighteenth century wants to characterize this power in a single word, it calls it ‘reason’. ‘Reason’ becomes the unifying and central point of this century, expressing all that it longs and strives for, and all that it achieves. . . . The eighteenth century is imbued with a belief in the unity and immutability of reason. Reason is the same for all thinking subjects, all nations, all epochs, and all cultures. From the changeability of religious creeds, of moral maxims and convictions, of theoretical opinions and judgements, a firm and lasting element can be extracted which is permanent in itself, and which in this identity and permanence expresses the real essence of reason.” (Cassirer 1951:5-6)

The focus of this *esprit systématique*, and of reason, was to reveal the underlying order of reality. Its application was thus to be applied to inquiries concerning not only the nature of the physical world but also the nature of society and that of the human being.

However, with this application of reason came a universalizing tendency of modernity. Roebuck argues that the modernity that emerged from the Enlightenment ultimately constituted a form of “philosophical monism”:

“The Enlightenment framework would have us search for a universal norm, a particular vocabulary, and one set of intellectual categories to use as a foundation and from which to judge others. It holds that all reality and all the branches of our knowledge of it, form a rational coherent whole, and there is ultimate consistency between human ends.” (Roebuck 1999:23)

As Peet observes, attempts were made during the Enlightenment Period “to construct a universal method of analysis which would yield perfect certainty by ordering representations and signs to mirror the ordering of the world” (Peet 1998:119), a mode of analysis that the Enlightenment and Modern thinkers alike, in taking their inspiration from Newton and not Descartes, came to view as the rigorous application of the scientific method. Peet sees the modernity of the late twentieth century, as reflected in such philosophical approaches as structuralism and realism, as still strongly echoing Kant and other Enlightenment thinkers:

“Structuralism, structuration, realism – these are philosophies which believe, in various ways, and to different degrees, in the promise of modernity, especially the liberatory potential of modern scientific understanding: evidence, fact, truth shall set us free! Scientific liberation breaks the constraints of nature on human life. Liberation also means applying knowledge to the rationalization of society, freeing it from the mysticisms and injustices of the past. Liberation may be meant too in the more radical sense of an escape from human nature as it has been. In the modern world, that European space-time following the feudal middle ages, especially since the Enlightenment of the eighteenth century, progress and liberation are seen to be founded in reason, logic and scientific thought. Reason advances knowledge; knowledge enables science; and science serves the liberatory aims of society. In enlightenment thinking, ethics can be based on the crystallized lessons of human experience, mediated or interpreted by rational inspection, rather than having a divine source. In this, human reasoning about experience replaces God as moral authority, and the rational individual becomes self-guiding, and possibly self-governing, rather than a slave to (religious and civil) authority. The modern aspiration is that all people sharing a similar ethical rationality might agree on a system of norms to guide the operation of society. Self-disciplined by ethical reason, individuals might voluntarily adhere to decisions reached through rational democratic means, rather than constantly be disciplined by laws. The benefits of science could thus be shared by all in a just, egalitarian, ethical, and technologically advanced modern society. Even more, with a universal scientific method, ‘there can be nothing so remote that we cannot reach to it, nor so recondite that we cannot discover it’ (Descartes 1968:92). Thus, in the sense of limitless, self-directed progress [is] embedded in modernism.” (Peet 1998:194)

The belief that there exists some fixed, indubitable foundation upon which knowledge and truth can be based pervades much of modern Western thought. The very idea that such a foundation might not exist raises the fear of relativism and what Bernstein (1983) came to call the “Cartesian Anxiety.” Rorty, however, dismisses this anxiety, arguing that foundationalism is simply the privileging of certain sorts of representations, expressions and processes that “in turn, are the touchstones for distinguishing legitimate from illegitimate knowledge: legitimate knowledge makes reference to them, thereby guaranteeing that the acquired knowledge mirrors the world, while illegitimate knowledge does not” (Barnes 2000:279).

Foundationalism involves assembling these privileged representations, expressions and processes into interpretive frameworks which are then overlaid onto reality so as to

impose some comprehensible order to that reality. Foundationalism, in general, is both reductionist and structural, seeking the explanation of events or phenomena by revealing underlying causes. This interpretative framework, however, is inherently biased and incomplete, creating an understanding of the world already tainted by that selected privileged assemblage to the exclusion of many other representations, expressions and processes. So understood, foundationalism is just another exercise in modelling and ordering, an exercise that is not unique to modernity. Medieval Europe (Foucault's *Renaissance episteme*) was equally foundational, ordering reality around a privileged theological assemblage.

The foundationalism of modernity privileges reason and experience, seeking truth through the application of human reason upon human experience. Within this foundationalism and its universalism there also evolved a uniformitarianism (Lovejoy and Boas 1935) wherein it was believed that all humans and all societies evolved in the same way, everywhere, in any period of time. The *Modern episteme* consists of a series of universalizing of Grand Narratives of freedom, progress, utopia and emancipation (Hetherington 1997), and a quest for universal knowledge of things – based upon objective, neutral methods for revealing knowledge and truth – that would be “true everywhere, for all time and of everyone” (Roebuck 1999:23). If this was indeed true, it would then be possible to identify and map out, in predictable stages of development, the evolution of all societies, culminating at some common intellectual, moral and even cultural apex aspired to by all humanity. Such a belief not only resonated throughout imperial and colonial discourses but also more recently in such theories as Walt

Rostow's (1960) stages theory of economic development that, in turn, influenced developmental programs for much of the latter half of the twentieth century.

This foundationalism and its associated outcomes are therefore closely associated with the Western belief in progress. As was the case in the modern belief in an underlying order of reality, its belief in progress pre-dates modernity. The origins of "progress" in Western thought lie in Christian eschatology. In early Christian thought, history was understood as being finite; it was directional and had an end, being that point in time when the universe would be properly ordered, both physically and morally, and human suffering would cease to be. History was thus directional, culminating in some known end. By Medieval times and the Renaissance, this Christian worldview focused more on the moral conduct of each individual, as practice throughout his/her life, that would culminate with one's successful entry into heaven. With the embracing of Newton's mechanistic universe, history remained future-directed, but no longer towards some spiritual end. Instead, history and progress were seen as following knowable natural laws and were the outcomes of human actions. The future, as human-directed, consisted of possibilities and alternatives, realizable through the acquisition and application of knowledge of the world. Thus, the belief in an underlying order to reality that was knowable, predictable and manipulable merged with a belief in progress towards a better world, a better society and even a better human being.

1.4 *Epistemes, paradigms and modelling*

The purpose of this chapter has been to sketch out, albeit in crude terms, how ideas come to be accepted as knowledge and as truth within a society. It took as its point of departure the acknowledgment that an individual is born into an already existing social world imbued with knowledge. Every society maintains complex *stocks of knowledge* which individuals draw upon. However, these stocks are in constant turmoil as new knowledge is manufactured and incorporated in these, and older knowledge is either modified or discarded entirely. What is considered to be knowledge by a society is determined by what Foucault termed a society's *episteme*, or worldview. An *episteme* incorporates not simply how a society approaches questions of epistemology, or how knowledge is attainable, but also what the metaphysical foundation of a society is, or what we believe can be/to be knowable. Foucault expanded this notion in his later works to include aspects of power, which he termed a *dispositif*.

As these *stocks of knowledge* have become increasingly complex, so too has their organization, ultimately coming to be organized into disciplines and even sub-disciplines. This is particularly true of Euro-American knowledge since the Enlightenment Period. The scholastic communities of these disciplines effectively define both the form and content of the discipline. As a result, knowledge is not simply the product of some neutral, objective process, but is the product of highly contested social environments. To Kuhn, disciplines are organized around paradigms. A paradigm consists of some set of received beliefs shared by those members of the discipline's community, providing the essential framework within which normal science operates

and, in a sense, disciplinary integrity is maintained. Knowledge, therefore, is seen as being defined and constituted within disciplinary paradigms that are, in turn, nested within a society's broader *episteme/dispositif*.

Finally, the discussion turned to a consideration of foundationalism, suggesting that much of Western thought remains foundational in its nature. The idea that there exists some fixed, indubitable foundation upon which knowledge and truth can be based led to a modernity characterized by what Roebuck terms a "philosophical monism" and a uniformitarianism which marginalises difference and overwrites heterogeneity in a quest for universalism with which to order reality. In subsequently binding a belief in some underlying order to reality with a belief in progress continues to provide modernity with a powerful discourse through which it continues to order the world and justifies its own relevancy.

During the course of this discussion, several important aspects of *epistemes* and paradigms, however, have been raised which are of relevance to this study. These concern the very aspects modern foundationalism seeks to silence, including questions of hegemony, of dominant and marginalised frameworks, of social and intellectual heterogeneity, and of temporal instability. Of particular interest in this study is the nature of heterogeneity both within society and more specifically in the manufacturing of what comes to be recognized as knowledge. Focusing on this heterogeneity, which John Law (1994) describes as irreducible, opens new vistas to investigation. By acknowledging heterogeneity one acknowledges difference in understanding, interpretation and vision in any period of time.

This acknowledgment of heterogeneity permits one to understand knowledge as contested. It allows one to apply Foucault notions of power to Thrift's analysis of a society's *stocks of knowledge*, thereby organising these stocks into dominant stocks institutionalized by that society's holders of power and other stocks marginalised by those same holders of power. To acknowledge dominant and marginalised stocks of knowledge is to expose the contested spaces of understanding and truth.

The ideas of hegemony and marginalisation are also crucial in this examination. It has been suggested that an *episteme* represents only one framework of knowledge operating within a society during a given period of time. Other frameworks are at work as well. Similarly, a paradigm only one framework operating within a discipline. Other frameworks are at work as well in a discipline challenging normal science and its paradigm. In the same way, the models which a discipline devises to seek explanations and understanding represent only one set of possible models considering one set of possible variables seen to be of relevance and yielding one set of possible outcomes. Alternate approaches to geographical praxis, and alternate forms of modelling, exist which challenge the hegemonic paradigm and its tools and theories. This will be the focus of the next chapter.

Chapter 2. Geographical Praxis: Models, Systems and Actor-Network Theory

In the previous chapter it was suggested that modern knowledge is established and organized within disciplines characterized by paradigms that are determined in large part by the *Modern episteme/dispositif*. A discipline's paradigm represents the dominant framework of praxis of a discipline within which themes of research and education are established. This praxis also defines what questions are understood to be relevant to a particular discipline, and the methods and techniques deemed appropriate for conducting research within that discipline.

What constitutes relevancy is an important aspect of praxis. For knowledge to be relevant, it has to be relevant *to* something; it must be seen as either providing answers to questions raised within a society or helping to provide answers to these questions, whether these are posed as questions of spiritual salvation or questions of simple survival. Relevancy is, therefore, a relational concept. To moderns, relevancy has been principally linked to questions of human needs and, as such, is essentially anthropocentric in nature. Seen through this anthropocentric lens, geography has always been relevant. From its earliest anthropological origins, geography has provided humanity not only with knowledge essential to survive in an often hostile physical

world but also with knowledge that helped to ‘explain’ the place of humanity in an often unfathomable and frightening cosmos.

However, what exactly constitutes relevant geographical knowledge has changed over time. In the case of modern geography, what is considered to be relevant geographical knowledge is determined by the Modern *mentalité* and the search for foundational relations that explain the underlying order of reality. Beginning during the 1980s, there has emerged a growing chorus of critics contesting modernity and its foundationalism. These scholars, categorized as feminists, post-structuralists, post-colonialists and postmodernists, emphasize what Peet (1999:195) describes as “that other side of rational modernity, its peasant, female, and colonized victims, its disciplinary institutions (schools, prisons, psychiatric clinics).”

How, then, is one to approach questions of geography? As suggested in chapter one, each discipline, while dominated by a particular paradigm and associated set of questions and methods, is populated by a heterogeneous community of scholars engaged in wide range of approaches and focusing on wide range of questions, some of which can be considered as normal science and others as alternatives to mainstream thought.

This chapter considers three approaches to geographical enquiry. It begins by considering ‘modern’ geography, or geography inspired and motivated by Enlightenment ideas. I will briefly explore the history of modern geography and the quest for foundational sets of relations to reality through increasingly sophisticated analyses, methods and techniques. The effectiveness of such modelling is subsequently questioned in terms of its ability to reflect a reality that is heterogeneous and ultimately resistant to homogenizing or universalizing explanations.

This chapter thus turns to post-modern approaches to geographical praxis, beginning with the geography of Michel Foucault, heterotopia, and his genealogical approach as an ethnographic framework for engaging this heterotopia. His geographies of power will be considered as the means of exploring and explaining existing social and spatial structures. Finally, Actor-Network Theory is introduced as an ethnographic sensibility that fully engages this heterotopia, and is considered as a means of exploring questions of difference and alterity in this a heterogeneous world.

2.1 Geographies of foundations: relevancy and modern geography

If geography is, as Unwin suggests, “one of the oldest forms of intellectual enquiry” (Unwin 1992:1), it is first and foremost, a practical and situated knowledge. David Livingstone writes:

“Just as there can only be a *situated* rationality, so too can there only be a *situated* geography. For geography has meant different things to different people in different places and thus the ‘nature’ of geography is always negotiated. The task of geography’s historians, at least in part, is thus to ascertain how and why particular practices and procedures come to be accounted geographically legitimate and hence normative at different moments in time and in different spatial settings.” (Livingstone 1992:28-29)

How, then, have modern geographical methods and techniques come “to be accounted geographically legitimate”? As suggested in chapter one, the Modern *mentalité*, upon which a discipline’s praxis is defined, is conditioned by the search for foundational relations which reveal the underlying order, or ‘truth,’ of reality. These relations are understood to be based upon knowledge that is objective and neutral, resulting in a universal knowledge of things that would be, as Roebuck wrote “true everywhere, for all time and of everyone.” In the case of modern geography, this had led to a series of paradigm shifts that have transformed the discipline from a dominantly

idiographic to a dominantly nomothetic discipline. This, in turn, has led to the adoption of new methods and techniques for modelling reality that seek relational explanations instead of descriptive explanations, moving progressively from causal speculations about human-environmental relations at the turn of the last century, to the spatial science of the Quantitative Revolution of the 1950s and 1960s, to the Marxist-inspired structuralism and application of political economy theory to geographical questions beginning in the 1970s. Since then, however, these methods and techniques, along with the very idea of foundationalism upon which they are based, have been increasingly challenged by what is commonly termed “post-modern” thought not only in geography but in other social sciences as well. I will return to this issue in the next section.

2.1.1 The search for order in modern geography

The search for order, as understood by modern geographers, can be traced to Immanuel Kant and even further back to Bernard Varenus. With the re-emergence of humanism and skepticism during the late Renaissance, the understanding of what constituted relevant geographical knowledge began to change, as did the disciplinary form of geography, marking the origins of what became modern geography. Bernard Varenus (1622-1650) was the first scholar to propose that geography be separated from cosmology (Baker 1995). In his *Geographia generalis*, Varenus considered the concern of geography to be earthly in nature, dividing it into two basic parts: a *general* geography that considered the earth and its general characteristics, and *special* geography that considered individual regions and the specificity of “their site, divisions, boundaries and other matters worth knowing” (Varenus in Unwin 1992:67). He divided

general geography into three components: an *absolute* part, concerned with the earth, its constituents and its properties; a *respective* or *relative* part, concerned with the relationship between the earth and celestial phenomena; and a *comparative* part, concerned with differences between places. He divided special geography into *chorography*, concerned with regions of medium size, and *topography*, concerned with small tracts or places. The distinction between general and special geographies also resulted in a divergence in methodologies. While he associated general geography with other natural sciences and their methods of inquiry, special geography was more descriptive and subjective. As Unwin summarizes,

“Varenus was seeking to make geography a mathematical science, concerned with general laws and principles, while at the same time recognizing that the inclusion of people and regional description meant that much of it had to be based on empirical evidence. It also reflects an attempt to combine the new inductive methodology of Bacon with the logical mathematical proofs of previous science.” (Unwin 1992:68)

Thus, it is with Varenus that one sees not simply the first steps in the transformation of geography into its modern, scientific form but also the fledgling debates concerning geographical methodology which still persist within the discipline to this day.

Yet, one must again turn to Kant for the philosophical basis of modern geographical method. As noted in the first chapter, it was Kant who made the crucial synthesis of the rationalism of Descartes, Spinoza and Leibnitz, and the empiricism of Locke, Berkeley and Hume, thereby creating the modern epistemological framework. Writing a century after Varenus, Kant proposed in his 1757 *Outline and prospectus for a course of lectures in physical geography* (later published in 1802 as the *Physische Geographie*) that there are three approaches to geography: a mathematical approach, concerned with

the study of forms; a political approach, concerned with the study of people and social structure, particularly political organization; and a physical approach, concerned with the study of the natural conditions of the earth and its inhabitants, including humans. In this taxonomy, physical geography provided the crucial foundation for all other forms of geographical enquiry. Also importantly, Kant understood geography, along with history, to be *a posteriori* forms of knowledge, based on experience and sense perception and, thus, empirical in nature. This became the theoretical framework for modern geography that was subsequently put into practice by Alexander von Humboldt and Carl Ritter, who are credited as being the first modern geographers.

However, geography, and geographical praxis, was influenced, perhaps more, by advances in other sciences to which geography maintained close relations than by the specific works of Varenus and the philosophical musings of Kant. J.H. Parry, for example, writes of the historically strong link between geography and science,

“Geographical exploration, with its associated skills of navigation and cartography, was not merely the principal field of human endeavour in which scientific discovery and everyday technique became closely associated before the middle of the seventeenth century; except for the arts of war and of military engineering and (to a very limited extent) medical practice, it was almost the only field hence its immense significance in the history of science and of thought.” (Parry in Livingstone 1992:32)

Certainly, much of early modern geography was idiographic in its nature, as geographers joined with scientists, explorers, adventurers, capitalists and even dreamers in imposing order – a European order – onto an ever-expanding European-centred world. This early modern geography was therefore very much part of what Foucault interpreted as the taxonomic imperative of his *Classical episteme* (Foucault 1973).

2.1.2 Modelling truth in modern geographical praxis

While the earliest undertakings of modern geography consisted principally of idiographic studies, the organization of empirical data, and the delineation of regions based upon what Carl Schaefer was to term exceptionalism, some attempts at relational models were made aimed at explaining the observed differences between peoples and societies. One such theory that gained prominence during the late nineteenth and early twentieth centuries was environmental determinism. The idea that human activities, and variations in the human condition from one region of the world to another, were controlled by the environment (Lewthwaite 1966) echoed through the works of the German scholars Friedrich Ratzel and Oscar Peschel and the Americans Ellen Semple and Ellsworth Huntington and struck a positive chord in a Europe intoxicated by imperial and colonial successes and was absorbed into these discourses (cf. Hudson 1977; Peet 1985; Stoddart 1986).

Other scholars, however, were not so convinced by the deterministic interpretation, suggesting that human-environmental relations were more interactive. The idea of possibilism, that embraced the important Enlightenment theme of emancipation, resonated initially in Vidalian geography and the French School of Geography, but also gained footholds in Britain in the works of Patrick Geddes and H.J. Fleure, and in the United States in the works of Carl Sauer and the Berkeley School. In perhaps his best known quotation, Fleure writes,

“There are no necessities, but everywhere possibilities; and man, as master of the possibilities, is the judge of their use. This, by the reversal which it involves, puts man in the first place – man, and no longer the earth, nor the influence of climate, nor the determinants conditions of localities.” (Fleure 1932:237)

What is of importance in considering these two early theories of a fledgling modern geography is that they both incorporated forms of regional modelling that privileged certain elements over other elements to explain the world. Whereas environmental determinism privileged environmental variables over human ones, possibilism privileged human agency over environmental conditions.

The 'scientising' of geography accelerated following the Second World War and the Richard Hawthorne/Fred Schaefer debate over relevancy (cf. Bunge 1979; Gregory 1978; Livingstone 1992). The Hawthorne/Schaefer debate was significant, not only for the transformation of geographical praxis which occurred as a result of this debate, but also in that it was the first time that the question of relevancy was actually raised and discussed. A new generation of geographers subsequently seized upon Schaefer's arguments. In an increasingly integrated world, the delineation of regions not only seemed increasingly problematic, but also increasingly irrelevant. Order in the post-war period was to be discovered within sets of relationships which increasingly linked the local, regional and global scales.

The logical positivism of Auguste Comte, and more specifically of the Vienna Circle, which replaced the idiographic approaches to regional geography, not only provided geography with a common methodological and epistemological basis already embraced by most other disciplines, but also re-affirmed the basic belief in some underlying order to reality that was knowable. The principles of logical positivism affirmed the search for that order. Gregory (1994:455) summarizes positivism as consisting of five essential steps. First, scientific statements had to be grounded on

direct, immediate and empirically verifiable experience of the world. Second, scientific observations had to be repeatable, through the use of the scientific method accepted and applied by the scientific community as a whole. Third, science was seen as advancing incrementally through the construction of formal theories which, once verified, became accepted as scientific laws. Fourth, such scientific laws were seen as having a strictly technical function. Fifth, and most importantly, these scientific laws would be progressively unified and would ultimately come to form a single, incontrovertible system of knowledge and truth. This last aspect of Positivism is crucial insofar as the 'discovery' of new relations, however minor, could be viewed as another step towards the revelation of that single, incontrovertible system of knowledge and truth.

The adoption of Positivism seemingly sounded the triumph of the scientific method that was to gain near hegemony during the 1950s and 1960s as the foundational methodology of geographic knowledge (Gregory 1994). Through Positivism, geography found a voice in quantifiable empiricism. The embracing of scientific modelling by physical geographers, that shifted the focus of research from description to process in geomorphology, hydrology, and climatology beginning in the early 1930s and continuing throughout the 1940s (cf. Horton 1932, 1933, 1935, 1945; Bagnold 1941), stimulated both a general debate about the nature of geography as a discipline – a debate that continues to this day – and a more specific debate amongst human geographers concerning the relevancy of their particular fields of geography. Positivism was to win out over regionalism in the human geographies as well during the Quantitative Revolution of the 1950s and 1960s. The literature of the time was rich in applications of

science and, more specifically, of statistical analysis. Initially applying such basic statistical methods as correlation analysis, regression models and hypothesis testing, geographers quickly expanded their statistical arsenal to include inferential statistics and non-parametric tests, the extension of bivariate analysis to multi-variate analysis (both multiple regression and factor analysis), and systems analysis (cf. Bunge 1962; Chorley and Haggett 1967; Haggett and Chorley 1969; Haggett 1965; Harvey 1969).

The triumph of positivist geography shifted the form of geographical modelling away from regions to the consideration of relations as expressed by spatial forms, from emphasizing place to emphasizing space, from descriptive sets of data to explanatory sets of relations. This transformation had a profound impact on geography (cf. Casey 1996; 1998). Yet, the exuberance of the early Quantitative Revolution gave way to a melancholy during the 1970s as it became increasingly evident that positivist methods and models, while capable of providing technical solutions to spatial questions, could not find answers to broader social issues associated at that time with capitalism and social justice. Two critiques of positivism ultimately emerged: a radical geographical approach, embracing Marxism and structuralism, and a humanist or hermeneutic geography privileging, once again, human agency.

Radical, or critical, geography continued the quest for foundation, shifting the focus of inquiry to an examination of underlying sets of relations understood as the fundamental causes of social order and spatial forms. Drawing largely upon the ideas of Marxian philosophy and Claude Lévi-Strauss' structural anthropology as a means of revealing the underlying order or structure of society (Lévi-Strauss 1963; Gregory

1978), prominent scholars including David Harvey, Henri Lefebvre, Doreen Massey, Manuel Castells, Neil Smith, Edward Soja and Michael Dear, turned to a form of historical materialist analysis (Johnston 1983) that focused on the mode of production of a society as conditioning that society's social, political and intellectual characteristics. Harvey (1973, 1982, 1985, 1996, 2000) in particular has explored the historical development of patterns and processes of spatial change as resulting from the social relations of capitalism.

The Frankfurt School of "critical theorists," including Jürgen Habermas (1975, 1976, 1979, 1984, 1987), took this Marxist structuralism one step further, incorporating the role of institutions, and principally the State, into it. This theoretical approach argued that the political and economic spheres of a society are inextricably linked and therefore social institutions had to be included in any analysis. Regulationists took this reasoning even further considering the regulatory structure, both formal and informal, of a state as fundamental to the perpetuation of social relations (cf. Aglietta 1979; Lipietz 1987). Political economy analysis was also extended into global analysis beginning with Immanuel Wallerstein (1974, 1979, 1980, 1983, 1984) and his world-systems analysis.

The introduction of political economy analysis and world-systems analysis into geography brings us to the idea of systems analysis as a means of revealing order.

Interest in systems analysis first appeared during the Quantitative Revolution. Harvey, in *Explanation in Geography* (1969) writes:

"If we abandon the concept of the system we abandon one of the most powerful devices yet invented for deriving satisfactory answers to questions that we pose concerning the complex world that surrounds us. The question is not, therefore, whether or not we should use systems analysis or systems concepts in geography, but rather one of examining how we can use such concepts and such modes of analysis to our maximum advantage." (Harvey 1969:479)

The systems terminology that appeared in human geography in the 1960s, originates in Von Bertalanffy's (1950) work on *general systems theory*. The application of systems analysis involves the abstraction of complexities of reality through the selection of what are seen as the relevant and linked variables that constitute a system. Systems analysis represented a principle means by which geographers sought to move beyond simple cause-and-effect models, incorporating more complex sets of variables into modelling. What emerged during the late 1960s and early 1970s was a complex taxonomy of analyses. Chorley and Kennedy (1971) list four types of systems: (1) *morphological systems* consisting of static relationships between distinct elements; (2) *cascading systems* in which links pass energy from one element to another in a system; (3) *process/response systems* which combine the morphological and cascading systems and focus on process, not form, of the system; and (4) *control systems* which constitutes a special form of process/response in which one or more values act to regulate a system and can therefore be used to control that system. Process/response systems were further divided into *simple-action systems* that are unidirectional, essentially cause-and-effect relationship or process law; and *feedback systems* (direct, positive and negative). Early examples of systems analysis include rural-urban migration (Mabogunje 1970), city systems (Pred 1977), regional development (Bennett 1975, 1978, 1979, 1981) and environmental systems, or ecosystems approaches (Stoddart 1965, 1967). Several geographers also attempted to unify physical and human geographies through this approach (Wilson 1981a). The idea of systems has since become increasingly central to

physical, environmental and human geographical enquiry, as illustrated by the almost all-persuasive adoption of its terminology in society generally. Today, along with ecosystems, one is confronted by agro-production systems, agro-forestry systems, political systems, economic systems and so on. It would seem that everywhere one turns in modern society, one encounters systems.

It is interesting to note how this fascination with systems has led to other forms of systems analysis being developed during the 1970s and 1980s, including lead-lag models, diffusion models and space-time models. Systems analysis has also become increasingly sophisticated, first with the consideration of discontinuities and the introduction of catastrophe theory (Poston and Stewart 1978) and bifurcation theory (Wilson 1981b, c) during the late 1970s, and second, with the incorporation of unpredictability and the introduction of irregular systems, fractals (cf. Mandelbrot 1990) and chaos theory (cf. Baumol and Benhabib 1989; Berry *et al* 1993; Berry and Kim 1996; Brown 1996) into systems analysis beginning in the mid-1980s.

Not everyone, however, was enamoured by systems analysis. To Michael Chisholm, writing in 1967, proponents of systems analysis were correct on three essential points. First, he acknowledged the need to study systems instead of isolated phenomena. Second, he agreed that there was a need to identify the basic principles that governed a system. Third, he recognized, in keeping with the precepts of the logical positivism of the times, the need for general principles. However, he maintained that general systems theory was “an irrelevant distraction” (Chisholm 1967:45) for two reasons. He first contended that only limited aspects of spatial forecasting and interaction modelling

were applicable to systems analysis, and second, that geography was concerned with only a small portion of much larger systems, making the application of systems analysis ultimately too artificial and abstract to be of any use. Gregory (1980) extended this criticism, arguing that a system is in constant change and attention should focus on the nature of this change. This was something systems analysis could not apparently do, representing, instead, a snap-shot of the system at a particular moment in time and, as such, provided only a static perspective. These comments by Gregory will become more relevant in our consideration of Actor-Network Theory.

Proponents of network analysis would agree with Gregory. A variation of systems analysis, networks have been interpreted in two ways. In one interpretation, drawn from sociology, networks consist of relational flows between actors, effectively human actors. The sociologists Stanley Wasserman and Katherine Faust (1988) highlight the key relational concepts in network analysis in their work on social network analysis. First, actors and their actions are viewed as interdependent rather than independent, autonomous units. Second, relational ties (or linkages) between actors are channels for transfer or 'flow' of resources (either material or nonmaterial). Third, network structure provide opportunities for or constraints on individual action. Finally, network models conceptualize structures, be these social, economic or political, as lasting patterns of relations among actors. They conclude

“Of critical importance for the development of methods for social network analysis is the fact that the unit of analysis in network analysis is not the individual, but an entity consisting of a collection of individuals and the linkages among them. Network methods focus on dyads (two actors and their ties), triads (three actors and their ties), or larger systems (subgroups of individuals or entire networks).” (Wasserman and Faust 1988:4-5)

Social network analysis has been applied to a wide range of social questions including the world political and economic system, community elite decision making, the diffusion and adoption of innovations, consensus and social influence and coalition formation (Wasserman and Faust 1988).

The fundamental difference between a social network explanation and a non-network explanation is the inclusion of concepts and information on relationships among units, or actors, in a study. Wasserman and Faust state that “regularities or patterns in interactions give rise to structures” (Wasserman and Faust 1988:6-7). They cite, as an example, the tendency of corporations to mimic each other, arguing that, “in order to get a complete description of this behaviour, we must look at corporate to corporate relationships, such as membership on each others’ boards of directors, acquaintanceships of corporate officers, joint business dealings, and other relational variables” (Wasserman and Faust 1988:6-7). Network analysis focuses on the properties of the relational system itself. Collins observed that “social life is relational; it’s only because, say, blacks and whites occupy particular kinds of patterns in networks in relation to each other, that ‘race’ becomes an important variable” (Collins 1988:413). From a sociological viewpoint, the relational ties between actors are of primary importance while the attributes of the actors are secondary. This will be very important in the formulation of Actor-Network Theory.

The second interpretation of networks analysis is that incorporated into industrial analysis. In this application, an essential dichotomy within industrial networks is retained between networks of actors and technological systems. Actors play the pivotal

role in industrial networks: “the actor faces the heterogeneity of the industrial network through its relationships and it is only by actors acting upon this heterogeneity that the network evolves” (Lundgren 1995:92). Thus, actors organize and manage heterogenic networks composed of economic, social and technical structures. These actors are not only individual persons; they can be collective entities including social organizations, business firms and public institutions (Lundgren 1995). However, there remains a distinct separation between networks of actors and technological systems or networks.

2.1.3 Shortcomings of modern geographical praxis

What is interesting to note is how the understanding of systems and networks has changed in only a few decades. In the earliest formulations of systems analysis there is the hint of Newton’s mechanistic universe. In keeping with the *Modern mentalité*, in which the goal of knowledge is to gain an understanding of the workings of reality, and through this understanding to manipulate that reality, the reproduction of reality into a simplified system was seen as a way of creating predictive models of reality. However, as these attempts at modelling reality became increasingly more cumbersome and complex, with the incorporation in subsequent decades with both relationalism and heterogeneity, prediction became difficult, if not impossible.

Indeed, it is at this point that modernity seems to have encountered a conundrum. In the search for universalizing foundations, human enquiry has moved towards ever-increasing levels of complexity to the point where both chaos and unpredictability have been incorporated into analyses thereby making any sort of foundational statement impossible. Furthermore, with this increasing complexity come questions concerning

what variables or elements of actors are relevant in any analysis thereby making modelling more and more subjective rather than objective. In the attempt to reveal the underlying order of reality, modern geographical enquiry has shifted from the development of simple deterministic or relational models of human-environment relations, to positivist approaches of spatial science, to structuralism and the analysis of systems, without achieving the goals set out by the *Modern episteme*. However, in its attempts to devise universal truths, modern enquiry has come face-to-face with an apparently irreducible heterogeneity. How can modernity, and geography specifically, overcome this conundrum? Can it overcome this conundrum? Should geography attempt to do so, or should geography look to other forms of modelling?

2.2 Geographies of power: Foucault, genealogy and heterotopia

The homogenizing, universalizing imperative of modernity has been the focus of many critiques. Skepticism of what was to become “modernity” dates back to the Enlightenment Period itself and even earlier. Peet (1999) cites Giovanni Battista Vico as one such early critic of the emerging modernism; Roebuck (1999) cites Johann Gottfried von Herder. More recent critiques have been raised by feminist, post-colonial and post-structural scholars, each drawing upon questions of Otherness, marginalisation and heterogeneity in an effort to carve spaces out of this homogeneity, wherein alterity is revealed. Others, such as Kevin Hetherington (1997) in his innovative work *The Badlands of Modernity*, have sought to retain the idea of heterogeneity, while assuming a more conciliatory position with modernity.

Each of these critiques challenges, in some manner, *a priori* modes of reasoning reflected in Modern thought. Chris Philo suggests that geography, as a discipline, is uncomfortable with such challenges due to its focus on empiricism and

“its recent obsession with securing philosophical and methodological base camps – a positivistic belief in spatial laws, a Marxist belief in social relations impressing upon spatial form, a humanistic belief in people’s subjectivities shaping places, a structuralist belief in the time-space constitution of engagements between agency and structure – from which empirical expeditions can be mounted.” (Philo 1999:209)

Michel Foucault provides one alternate approach to exploring questions of geography, an approach which rejects the idea of foundations, and considers, instead, the nature of power and how it affects social relations and spatial forms as these emerge in both specific times and places.

2.2.1 Foucault’s geography

In chapter one, some attention was paid to Foucault and his ideas concerning a society’s *episteme* and *dispositif*. An *episteme* constituted the discursive framework of meaning of a society within which knowledge comes to be. The *dispositif* enlarged this discursive framework to include non-discursive practices, institutions, regulations, laws, administrative measures, scientific statements, philosophic propositions and morality, through which knowledge is institutionalized. In this metamorphosis, Foucault also enlarged his methodology. Whereas he employed what he termed his archaeology to analyze the linguistic systems, characteristic of an *epistemes*, Foucault came to employ a genealogical analysis that considered changes in systems of discourse by connecting them to changes in non-discursive practices evident in social power structures. In so doing, he linked knowledge, truth and power together.

Foucault's geographical vision is an outcome of his historical approach. To Philo (1999), Foucault's geography is derived from a vision of history which "necessarily opens up a heightened sensitivity to the way in which space and place are inextricably bound up in this history" (Philo 1999:205). More specifically, it is the product of Foucault's challenging of *total history* and his advocacy of *general history*. However, what does Foucault mean by *total history*? Philo quotes Foucault as describing the project of total history as "one that seeks to reconstitute the overall form of a civilization, the principle – material or spiritual – of a society, the significance common to all the phenomena of a period, the law that accounts for their cohesion" (Foucault in Philo 1999:210). Total history is therefore a totalising history, a universalizing history. It assumes that

"between all the events of a well-defined spatio-temporal area, between all the phenomena of which traces have been found, it must be possible to establish a system of homogeneous relations; a network of causality that makes it possible to derive from each of them, relations of analogy that show how they symbolise one another, or how they all express one and the same central core; it is also supposed that one and the same form of historicity operates under economic structures, social institutions and customs, the inertia of mental attitudes, technological practices, political behaviours, and subjects them all to the same type of transformation; lastly, it is supposed that history itself may be articulated into great units – stages or phases – which contain within themselves their own principle cohesion." (Foucault in Philo 1999:210)

Peet, in his examining of Foucault, writes in a similar vein:

"For Foucault, total history seeks to reconstitute the main principle behind the overall form of civilization: by supposing that a system of homogeneous relations or network of causality exists between events in a well-defined spatio-temporal area; by supposing that the same form of historicity operates in all aspects of life; and by supposing that history can be articulated in great units (stages, phases), each containing the principle of cohesion. All such impositions (of a priori grand historical visions) are suspect to Foucault because they impose a measure of order alien to details and differences and smooth over the confusions, contradictions and conflicts that form the real stuff of life." (Peet 1998:230)

Total history, thus, recounts the history of great themes, thoughts and persons, that together come to represent a specific epoch (Gay 1973; Cassirer 1951; Outram 1995). In the case of the Europe of the Enlightenment, history became tied to progress, a process that not only organized events into distinct epochs and linked epochs in succession, but also bound biological and social evolution together. The historian Porter writes that

“Many *philosophes* tried to develop, empirically, imaginatively or systematically, such a historical or anthropological vision, tracing the emergence of European man out of the state of ‘savagery’ which was assumed to have been the primeval origin, and which could be inferred from the ‘primitive’ condition of the tribes explorers were beginning to discover in darkest Africa, America and, eventually, Australia” (Porter 1990:18).

Total history also acquired a spatial imagery and direction. Hegel, in his 1822 *Lecture on the Philosophy of History*, writes that “the history of the world travels from east to west for Europe is the absolute end of history, just as Asia is the beginning” (Hegel in Porter 1990:65).

To Philo, Foucault is “uneasy about the practice of slicing up the flow of real historical occurrences into ponderous temporal ‘great units’” and sets about to “knock down the prized construct of continuity” (Philo 1999:211), proposing in its place a form of *general history*. Such history explores “spaces of dispersion” through which “the paraphernalia of grand historical visions – the *a priori* teleologies and ontologies, the ‘centralising’ and the ‘homogenizing’ – are overturned” (Philo 1999:212). These spaces of dispersion are local, particular and specific, populated by a myriad of things.

It is within these spaces of dispersion that the heterogeneous character of a society is revealed. It is important to remember, when exploring Foucault, that this heterogeneity is not simply a difference between places; heterogeneity occurs within places, with

multiple significations overwriting the same landscape. In his 1967 lecture, *Of Other Spaces* (Foucault 1986), given to architecture students, Foucault referred to such spaces as spaces of heterotopia. The term heterotopia originates from the study of anatomy, referring to circumstances where parts of the body are missing, out of place, extra or are alien (such as tumors). However, Foucault applies this notion to social difference, understanding and ordering within the social body, specifically exploring this idea in his discussion of Borges' Chinese Encyclopedia in *The Order of Things* (Foucault 1973:xv), and in his above noted lecture.

The theme of his 1967 lecture was our understanding of space. In opening this lecture, Foucault declares,

“The great obsession of the nineteenth century was, as we know, history: with its themes of development and of suspension, of crisis and cycle, themes of the ever-accumulating past, with its great preponderance of dead men and the menacing glaciation of the world. The nineteenth century found its essential mythological resources in the second principle of thermodynamics. The present epoch will perhaps be above all the epoch of space. We are in the epoch of simultaneity: we are in the epoch of juxtaposition, the epoch of the near and far, of the side-by-side, of the dispersed. We are at a moment, I believe, when our experience of the world is less that of a long life developing through time, than that of a network that connects points and intersects with its own skein.” (Foucault 1986:22)

Foucault argues that our understanding of space has changed fundamentally, from the medieval understanding of emplacement wherein there existed a hierarchy of places, through its dissolution into an understanding of space as sets of relations, understood as relations of proximity between points or elements. Foucault writes that

“the space in which we live, which draws us out of ourselves, in which the erosion of our lives, our time and our history occurs the space that claws and gnaws at us, is also, in itself a heterogeneous space. In other words, we do not live in a kind of void, inside of which we could place individuals and things. We do not live inside a void that could be colored with diverse shades of light, we live inside a set of relations that delineates sites which are irreducible to one another and absolutely not superimposable on one another.” (Foucault 1986:23)

Foucault's heterotopia consists of five principles:

1. First, "there is probably not a single culture in the world that fails to constitute heterotopias" (Foucault 1986:24). These spaces take two forms: crisis heterotopias found in primitive societies in the form of privileged, sacred or forbidden places reserved for specific individuals of that society; and what he terms deviation heterotopias of modern society "in which individuals whose behavior is deviant in relation to the required mean or norm are placed" (Foucault 1986:25). Examples of these sites include rest/nursing homes, psychiatric hospitals and, of course, prisons.
2. Second, "a society, as its history unfolds, can make an existing heterotopia function in a very different fashion; for each heterotopia has a precise and determined function within a society and the same heterotopia can, according to the synchrony of the culture in which it occurs, have one function or another" (Foucault 1986:25). He cites, as an example, a cemetery.
3. Third, "the heterotopia is capable of juxtaposing in a single real place several spaces, several sites that are in themselves incompatible" (Foucault 1986:25). Cited examples include the theatre stage, a garden and zoos.
4. Fourth, "heterotopias are most often linked to slices in time – which is to say they open onto what might be termed for the sake of symmetry, heterochronies" (Foucault 1986:26).
5. Fifth, and finally, "heterotopias always presuppose a system of opening and closing that both isolates them and makes them penetrable. In general, the heterotopic site is not freely accessible like a public place. Either the entry is compulsory, as in the case of entering a barracks or a prison, or else the individual has to submit to rites and purifications" (Foucault 1986:26).

In closing his lecture, Foucault draws upon a series of three examples: brothels, colonies and finally, a boat as examples of heterotopia:

“Brothels and colonies are two extreme types of heterotopia, and if we think, after all, that the boat is a floating piece of space, a place without a place, that exists by itself, that is closed in on itself and at the same time is given over to the infinity of the sea and that, from port to port, from tack to tack, from brothel to brothel, it goes as far as the colonies in search of the most precious treasures they conceal in their gardens, you will understand why the boat has not only been for our civilization, from the sixteenth century until the present, the greatest instrument of economic development ... but has been simultaneously the greatest reserve of the imagination. The ship is the heterotopia par excellence. In civilizations without boats, dreams dry up, espionage takes the place of adventure, and the police take the place of pirates.” (Foucault 1986:27)

Heterotopias, therefore, can be both regressive, as in the case of psychiatric hospitals and asylums, for example, and liberating, as in sites of alterity. Heterotopia thus comes to reflect the plurality and richness embodied within a society.

At the outset of this section on Foucault it was suggested that many critiques of modernity have focused on the homogenizing and universalizing imperative of modernity, each raising questions of Otherness, marginalisation and heterogeneity in an effort to carve spaces out of this homogeneity where alterity is revealed. Heterotopia can be seen as being such places, as contrasted to utopia which Foucault sees as consisting of no real place. Whereas a utopia serves as an image of society in some perfect form, heterotopia is a real place of difference. Kevin Hetherington, in his work *The Badlands of Modernity*, however, sees such places as being part of modernity itself. To Hetherington, heterotopia signifies spaces situated somewhere between ex-topia, or good place, and ou-topia, or no place (Hetherington 1997). Heterotopia is understood as “space-between,” “spaces of deferral,” or “places of Otherness, whose Otherness is established through a relationship of difference with other sites, such that their presence either provides an unsettling of spatial and social relations or an alternate representation of spatial and social relations” (Hetherington 1997:8). However, in this interpretation,

Otherness has to do with different modes of ordering rather than simply a contrast between order and resistance, between hegemony and marginality. As Hetherington emphasizes, “I do not define heterotopia as sites of resistance, sites of transgression or as marginal spaces, but precisely as spaces of alternate ordering” (Hetherington 1997:9). Later, he writes that “heterotopic places are sites which rupture the order of things through their different mode of ordering to that which surrounds them” (Hetherington 1997:46). The consequence of this is far-reaching, suggesting that one should not consider social order as simply mainstream and margins, but rather that society contains a myriad of alternate orderings based upon differing sets of relations. This is also crucial to Actor-Network Theory as will be seen.

To illustrate his understanding of heterotopia, Hetherington examines Paris’ *Palais Royal* of the late eighteenth century. To Hetherington, the *Palais Royal* reveals the interplay of spaces and counter spaces evident in a society, writing in much the same spirit Foucault did in describing his boat:

“Before the Revolution in 1789, the *Palais Royal* was one of the places in Paris for people of quality, and those who aspired to be part of the cultural elite, to be seen. Strolling around its gardens, arcades and shops one would find ‘financiers, musketeers, dukes, women of the Court, writers and doctors. In short, the crowd was elegant. The women came in their finest gowns, often arranging nightly trysts in the dark shadows of a tree’ (Isherwood 1986:219). It was here also, in the *Palais Royal*, that men and women would come to buy the books of the Enlightenment philosophers and to read the latest journals and newspapers. The *Palais Royal*, as well as being the residency of one of the leading members of the aristocracy in France, also contained gardens with fountains, a masonic temple, theatres, and an opera. It boasted cafés and restaurants, a stock exchange and pavilions were constructed to contain the variety of commercial enterprises and entertainment that were open to the public. ... If the *Palais Royal* was a place where the enlightened bourgeoisie came to mingle and promenade with members of the elite of French society, for the common people it was valued more as a site of spectacle. Popular theatre, festivities and all manner of circus entertainment found their way into the *Palais Royal*. As well as a site of civility, the *Palais Royal* was also a site of the carnivalesque, a space of cultural inversion.” (Hetherington 1997:2)

In this heterotopic space, the differing membership of French society intermingled – aristocracy and revolutionaries alike – engaged in acts of commerce, culture and insurrection.

The first significant aspect of Foucault's geography, therefore, is an acknowledgment of the heterogenous nature of the world as expressed through his spaces of dispersion. The second significant aspect of Foucault's geography is how he treats the plurality of things which populate his spaces of dispersion. Philo suggests that, as early as *The Archaeology of Knowledge*, Foucault "seems to be proposing ... a form of spatial ontology which proceeds by imagining a hypothetical space or place across which all of the events and phenomena relevant to a substantive study are dispersed" creating a world populated by a "playful juxtaposing of different categories of things; the mixing of the tangible and intangible, of natural and human, of collective and individual, of ongoing and time-bounded" (Philo 1999:218-219).

What is eliminated in this analysis is a sense of hierarchical structure and the division of social life into distinct economic, political, social and cultural strata (Philo 1999; Peet 1998). Order is to be located within the sets of relations between those 'things' that constitute the dispersion and not revealed through the application of some transcendental logic of how things are constituted (Peet 1998). Order is not imposed from outside; it consists of patterns in the spatial dispersion, the "distances between them (whether they stand together, nearby or far apart) being indicative of the extent to which they differ from one another" (Philo 1999:220) thereby suggesting an intelligible 'geometry.' However, as Philo observes,

“this is not a fixed geometry, Euclidian or otherwise: it is a momentary geometry locked irrevocably into the fleeting character of the things themselves and as such it is a geometry whose rootedness in the local time and place would be of little interest to the spatial scientist.” (Philo 1999:220)

This attitude transforms how one comes to see and understand the world. As Philo continues,

“when Foucault gazes out on the social world of the past he sees not the order of (say) a mode of production determining the lines of class struggle nor the order of (say) a worldview energising everything from how the economy functions to how the most beautiful mural is painted; rather, he sees the spaces of dispersion through which things under study are scattered across a landscape and are related to one another through their geography, the only order that is here discernible, by being near to one another or far away, by being positioned in certain locations or associated with certain types of environment, by being arranged in a certain way or possessed of a certain appearance, thanks to their plans and architectures.” (Philo 1999:220-221)

This Foucaultian world is not immersed in chaos but, rather, in connectedness. It is created through an order that is transient (Philo 1999) yet knowable through the rediscovery of local, changing rules.

2.2.2. The genealogical approach

This process of rediscovery is part of Foucault’s genealogical approach. As has been noted earlier, Foucault’s genealogy differs from the archaeology of his earlier works. Whereas archaeology constitutes a strict analysis of discourse, genealogy involves an examination of that which “conditions, limits and institutionalizes discursive formations” (Dreyfus and Rabinow 1983:104). As Dreyfus and Rabinow (1983:104) note, “[t]here is no pre- and post-*archaeology* or *genealogy* in Foucault.” Rather, these authors see archaeology and genealogy as complementary, quoting Foucault who argued in 1970 that

“Critical and genealogical descriptions are to alternate, support and complete each other. The critical side of the analysis deals with the system’s enveloping discourse; attempting to mark out and distinguish the principles of ordering, exclusion and rarity in discourse. We might, to play with our words, say it practices a kind of dogged detachment [une désinvolture appliquée]. The genealogical side of analysis, by way of contrast, deals with series of effective formation of discourse: it attempts to grasp it in its power of affirmation, by which I do not mean a power opposed to that of negation, but the power of constituting a domain of objects, in relation to which one can affirm or deny true or false propositions. Let us call these domains of objects its positivities, and to play on words yet again, let us say that, if the critical style is one of studied casualness [la désinvolture studieuse], then the genealogical mood is one of lighthearted positivism [un positivisme heureux].” (Foucault in Dreyfus and Rabinow 1983:105)

Genealogy is an inquiry into the ancestry, or “family association” (Clayton 2000b:292), of a contemporary institution, idea or practice (Foucault 1980b). It is, remaining with Clayton, “an historical reconstruction of the relations between power, knowledge and the human subject that aspires to be an immanent critique of the present” (Clayton 2000b:292). Dreyfus and Rabinow similarly write that genealogy consists of writing a history of the present. This historical inquiry of the present is not, however, teleological. Genealogical investigations have no predetermined starting point or destination (Foucault 1980b). It is not about trying to capture the meaning or the significance of a past epoch or about trying to find underlying laws of history (Dreyfus and Rabinow 1983). A genealogist does not select a specific aspect of the present and then retrace this aspect – whether this is an institution, a practice or idea – back through history to identify its origins and then explain how it gradually came to be an outcome of some inevitable process of advancement or progress. Dreyfus and Rabinow (1983:139) contend that “genealogy opposes itself to traditional historical method; its aim is to record the singularity of events outside of any monotonous finality’.” “Genealogy,” they write, “seeks out discontinuities where others found continuous

development. It finds recurrences and play where others found progress and seriousness. It records the past of mankind to unmask the solemn hymns of progress” (Dreyfus and Rabinow 1983:106).

Genealogy takes a lot of work. As Foucault (1984:76-77) describes genealogy in the opening of his essay, *Nietzsche, Genealogy, History*,

“Genealogy is gray, meticulous and patiently documentary, it operates on a field of entangled and confused parchments, on documents that have been scratched over and recopied many times. ... Genealogy, consequently, requires patience and a knowledge of details, and it depends on a vast accumulation of source material. Its ‘cyclopean monuments’ are constructed from ‘discreet and apparently insignificant truths and according to a rigorous method’; they cannot be the product of large and well-meaning errors.’ In short, genealogy demands relentless erudition. Genealogy does not oppose itself to history as the lofty and profound gaze of the philosopher might compare to the molelike perspective of the scholar; on the contrary, it rejects the metahistorical deployment of ideal significations and indefinite teleologies. It opposes itself to the search for ‘origins’.”

The present is to be understood as evolving out of the plurality of the past. A genealogist, therefore, seeks to consider this plurality and to reveal the historical circumstances out of which the present emerges. The genealogist avoids the search for depth and underlying currents, opting instead to consider the surface of events as constituted by small details, minor shifts and subtle contours (Dreyfus and Rabinow 1983). “The genealogist recognizes that the deep hidden meanings, the unreachable heights of truth, the murky interiors of consciousness are all shams” and that “the more one interprets, the more one finds not the fixed meaning of a text, or of the world, but only other interpretations” (Dreyfus and Rabinow 1983:107). In effect, a genealogist rummages around history to reveal the multiple sources of the present. In so doing, Clayton (2000b:291) writes that “Foucault’s histories of the asylum, the clinic, the prison and sexuality describe how general formulas of domination and discourses on the

‘dangers’ of madness, sexuality and so on, emerged from discrete practices and seemingly mundane events.”

Since Foucault is concerned ultimately with the present, his work challenges the tendencies of modernity. Essential to this work is the resurrection of the subjugated knowledges. These knowledges, as noted in the previous chapter, are not simply marginalised knowledges but are also knowledges “that have been buried and disguised in a functionalist coherence or formal systemisation” (Foucault 1980b:81) nurtured by total history. Such knowledges form the basis for challenging total history and universalizing processes of knowledge-building, or in the case of modernity, the universalizing tendency of scientific discourse. However, it is not the task of genealogy to simply reclaim or legitimize these subjugated knowledges. These knowledges are then to be used to challenge the hegemonic knowledge which silenced them in the first place. Genealogy constitutes “a painstaking rediscovery of struggles together with the rude memory of their conflicts” (Foucault 1980b:83) through which these knowledges were originally subjugated. Through genealogy, the scholar seeks to engage with what Foucault described as local, discontinuous, disqualified, illegitimate knowledges that resist the efforts of those to create a unitary body of theory and knowledge. As such, they are not anti-knowledge, but rather, anti-sciences. Foucault writes, “[w]e are concerned, rather, with the insurrection of knowledges that are opposed primarily not to the contents, methods or concepts of a science, but to the effects of the centralising powers which are linked to the institution and functioning of an organized scientific discourse within a society such as ours” (Foucault 1980b:84). He continues,

“in contrast to the various projects which aim to inscribe knowledge in the hierarchical order of power associated within science, a genealogy should be seen as a kind of attempt to emancipate historical knowledge from that subjection, to render them, that is, capable of opposition and of struggle against the coercion of a theoretical unitary, formal and scientific discourse.” (Foucault 1980b:85)

This raises the third crucial aspect of Foucault’s project: the revealing of the underlying historical process as one of power struggles. To Foucault, the real story of history is the story of power and knowledge. The relationship between power and knowledge was also touched upon in chapter one and how this relationship existed in Foucault’s *dispositif*.

2.2.3 The nature of Foucaultian power

It is the duty of the genealogist to repudiate the doctrine of progress and discard the search for ideal significations and original truths, and instead consider the nature of power in society and what Dreyfus and Rabinow term the “play of wills” in Clayton’s “mundane events.” It is the duty of the genealogist to challenge what Foucault describes as the “universal reign of the normative” and its associated practices (Foucault 1977) and to consider instead questions of contest and domination. The present is the outcome of struggles. Confronted by questions of “subjection, domination, meaning and value, of virtue and goodness, he [the genealogist] looks for strategies of domination” acknowledging that relations work “themselves out in particular events, historical movements and history” (Dreyfus and Rabinow 1983:109). Clayton (2000b:291) similarly writes that “Foucault insisted that the disciplinary make-up of ‘our’ society rests on a ‘haphazard play of dominations’ – on minor accidental and often fragile processes and struggles ‘of different origin and scattered location’ (Foucault 1986).” In

this manner, power becomes the organising principle of social relations and spatial structures.

In *The Subject and Power*, Foucault acknowledges that the purpose of his work has been an attempt to “create a history of the different modes by which, in our culture, human beings are made subjects” (Foucault 1983:208). This purpose necessarily introduced questions of power since, “while the human subject is placed in relations of production and of signification, he is equally placed in power relations which are very complex” (Foucault 1983:209). However, Foucault felt that there was no adequate means of exploring the nature of power. Rejecting reason as being too “sterile” to properly explore the nature of power, he turned to studying specific rationalities, or what he termed processes, such as madness, illness, death, crime and sexuality, using his genealogy to reveal circumstances from which our present understanding of these evolved. He went even further, suggesting the importance of considering forms of resistance against different forms of power. That is to say, to discover what society means by sanity, study insanity; what is meant by legality, study illegality; and to consider what society means by power, study resistance (Foucault 1983). In this manner, his genealogical explorations are anti-authority. These struggles

“attack not so much ‘such or such’ an institution of power, or group, or elite, or class, but rather a technique, a form of power. This form of power applies itself to immediate everyday life which categorizes the individual, marks him by his own individuality, attaches him to his own identity, imposes a law of truth on him which he must recognize and which others have to recognize in him. It is a form of power which makes individuals subjects.” (Foucault 1983:212)

These types of struggles include struggles against forms of domination, including ethnic, social and religious; struggles against forms of exploitation; and struggles

against forms of subjection which tie “the individual to himself and submits him to others in this way” (Foucault 1983:212).

How, then, is power to be understood? How does power ‘act’? Dreyfus and Rabinow (1983) consider Foucaultian power as “a concept which attempts to understand how social practices work without falling into a traditional theory of history” and which “cannot be a merely external force organizing local interactions; nor can it be reduced to the totality of individual interactions, since in an important way it produces interaction and individuals” (Dreyfus and Rabinow 1983:207). To Foucault, power is inextricably bound to truth and right in a society, writing that “we are subjected to the production of truth through power and we cannot exercise power except through the production of truth” (Foucault 1980b:93). He therefore asks us to consider “what rules of right are implemented by the relations of power in the production of discourses of truth? Or alternatively, what type of power is susceptible of producing discourses of truth that in a society such as ours are endowed with such potent effects?” (Foucault 1980b:93).

He is, however, quick to emphasize that his notion of power is not Marxian wherein “power is taken to be a right, which one is able to possess like a commodity, and which one can in consequence transfer or alienate, either wholly or partially, through a legal act or through some act that establishes a right” (Foucault 1980b:88). It is not a concrete power. Instead, it is a “relation of force” (Foucault 1980b:89).

In his two lectures, given in 1976, Foucault raises five important methodological aspects of his notion of power:

1. "It seemed important to accept that the analysis in question should not concern itself with the regulated and legitimate forms of power in their central locations, with the general mechanisms through which they operate and the continual effects of these. On the contrary, it should be concerned with power at its extremities, in its ultimate destinations, with those points where it becomes capillary, that is, in its more regional and local forms and institutions" (Foucault 1980b:96).
2. "The analysis should not concern itself with power at the level of conscious intention or decision" (Foucault 1980b:97). One should avoid asking who/what has power and instead "ask instead how things work at the level of on-going subjugation, at the level of those continuous and uninterrupted processes which subject our bodies, govern our gestures, dictate our behaviours" (Foucault 1980b:97).
3. "Power is not to be taken to be a phenomenon of one individual's consolidated and homogeneous domination over others, or that of one group or class over others" (Foucault 1980b:98). As already noted above, "power must be analysed as something which circulates, or rather, as something which only functions in the form of a chain. It is never localised here or there, never in anybody's hands, never appropriated as a commodity or piece of wealth. Power is employed and exercised through a net-like organisation" (Foucault 1980b:98). Individuals are therefore vehicles of power and not its points of application; "the individual, that is, is not the *vis-à-vis* of power; it is, I believe, one of its prime effects" (Foucault 1980b:98).
4. "Power establishes a network through which it freely circulates, this is true only up to a point" (Foucault 1980b:99). However, Foucault's power does not constitute a sort of democratic or anarchic distribution. "One must rather conduct an ascending analysis of power, starting, that is, from its infinitesimal mechanisms, which each have their own history, their own trajectory, their own techniques and tactics, and then see how these mechanisms of power have been – and continue to be – invested, colonised, utilised, involuted, transformed, displaced, extended, etc., by ever more general mechanisms and by forms of global domination" (Foucault 1980b:99). Therefore, "what must be shown is the manner in which they are invested and annexed by more global phenomena" (Foucault 1980b:99).
5. "It is quite possible that the major mechanisms of power have been accompanied by ideological productions ... It is the production of effective instruments for the formation and accumulation of knowledge – methods of observation, techniques of registration, procedures for investigation and research, apparatuses of control. All this means that power, when it is exercised through these subtle mechanisms, cannot but evolve, organise and put into circulation a knowledge, or rather apparatuses of knowledge, which are not ideological constructs" (Foucault 1980b:102).

Foucault elaborated upon these methodological aspects in *The Subject and Power*,

provided to Dreyfus and Rabinow as an Afterword to their 1983 book, in his

consideration of struggles of power. First, such struggles are 'traversal struggles' insofar

as they are not associated with any specific government or economic system. Second, each specifically concentrates on the effects of power on people. Third, they are ‘immediate struggles’ wherein people are not searching for any ‘chief enemy’ but rather for an immediate enemy, suggesting in so doing that these are to be understood as anarchistic struggles. Fourth, each addresses the question of the status of the individual. Fifth, they are an opposition to a *régime du savoir* and as such are struggles against the privileges of knowledge. Sixth, and finally, each of these struggles centre on the question, ‘Who are we?’ (Foucault 1983).

Yet, power is an elusive concept in the hands of Foucault. Clayton summarizes Foucault’s power as “an incessant, decentred and malleable ‘force field’ of strategic relations among individuals, groups and institutions that works ‘within the social body’ and facilitates (rather than reflects) the development of capitalism and the nation-state” (Clayton 2000b:291). To Foucault, power is omnipresent, it “comes from everywhere” and has a “capillary form of existence” (Foucault 1980b:97). Foucault, himself, writes

“that something called Power, with or without a capital letter, which is assumed to exist universally in a concentrated or diffused form, does not exist. Power exists only when it is put into action, even if, of course, it is integrated into a disparate field of possibilities brought to bear upon permanent structures.” (Foucault 1983:219)

Power is therefore recursive; it is performed. It is not a function of consent; a renunciation of freedom or a transference of rights. “What defines a relationship of power,” Foucault (1983:220) writes, “is that it is a mode of action which does not act directly and immediately on others. Instead, it acts upon their actions: an action upon an action, on existing actions or on those which may arise in the present or the future.” Such power is rooted in social networks or in the social nexus and “not reconstituted

‘above’ society as a supplementary structure whose radical effacement one could perhaps dream of’ (Foucault 1983:222).

The idea that power constitutes “a set of actions upon other actions” is crucial to Foucault. Power, in this sense, “consists in guiding the possibility of conduct and putting in order the possible outcome” (Foucault 1983:221). It effectively defines what is not simply “proper” in a society, but what is possible within the framework of a society’s *dispositif*.

How, then, is one to analyze power relations? Foucault (1983:223-224) summarises five essential points that must be considered:

1. “*The system of differentiations* which permits one to act upon the actions of others: differentiations determined by the law or by traditions of status and privilege; economic differences in the appropriation of riches and goods, shifts in the processes of production, linguistic or cultural differences, differences in know-how and competence and so forth. Every relationship of power puts into operation differentiations which are at the same time its conditions and its results.”
2. “*The types of objectives* pursued by those who act upon the actions of others: the maintenance of privileges, the accumulation of profits, the bringing into operation of statutory authority, the exercise of a function or of a trade.”
3. “*The means of bringing power relations into being*: according to whether power is exercised by the threat of arms, by the effects of the word, by means of economic disparities, by more or less complex means of control, by systems of surveillance, with or without archives, according to rules which are or are not explicit, fixed or modifiable, with or without the technological means to put all these things into action.”
4. “*Forms of institutionalization*: these may mix traditional predispositions, legal structures, phenomena relating to custom or to fashion (such as one sees in the institution of the family); they can also take the form of an apparatus closed in upon itself, with its specific loci, its own regulations, its hierarchical structures which are carefully defined, a relative autonomy in its functioning (such as scholastic or military institutions); they can also form very complex systems endowed with multiple apparatuses, as in the case of the state, whose function is the taking of everything under its wing, the bringing into being of general surveillance, the principle of regulation, and to a certain extent also, the distribution of all power relations in a given social ensemble.”

5. “*The degrees of rationalization*: the bringing into play of power relations as action in a field of possibilities may be more or less elaborate in relation to the effectiveness of the instruments and the certainty of the results (greater or lesser technological refinements employed in the exercise of power) or again in proportion to the possible cost... The exercise of power is not a naked fact, an institutional right, nor is it a structure which holds out or is smashed: it is elaborated, transformed, organized; it endows itself with processes which are more or less adjusted to the situation.”

2.2.4 The geographical vision of Foucault

Foucault himself acknowledges the pivotal role of geography in his historical studies, writing at the conclusion of his interview with the editors of the Marxist journal *Hérodote*, that “Geography must indeed necessarily lie at the heart of my concerns” (Foucault 1980a:77) , acknowledging that

“The longer I continue, the more it seems to me that the formation of discourses and the genealogy of knowledge need to be analysed, not in terms of types of consciousness, modes of perception and forms of ideology, but in terms of tactics and strategies of power. Tactics and strategies deployed through implantations, distributions, demarcations, control of territories and organizations of domains which could well make up a sort of geopolitics where my preoccupations would link up with your [Marxian] methods.” (Foucault 1980a:77)

This geographical bent is evident in his other studies. Philo (1999:222) writes of the geometric turn in Foucault’s histories of power, citing how in *Madness and Civilisation* (1967) Foucault addresses the ‘geography of haunted places’ and ‘spaces of unreason,’ and how in *The Birth of the Clinic* (1975) Foucault deals with the nosologies of disease. Philo concludes that “Foucault demonstrates through empirical detail the role played by spatial relations in the complex workings of discourse, knowledge and (crucially) power.” Peet (1999:230) adds another interesting observation to Philo, writing that “Foucault proposes that the phenomena, processes and structures of history are always fragmented by geography – that is, things turn out differently in different places.”

This idea of difference and the spatiality of power subsequently influenced a range of works on colonialism and imperialism (Clayton 2000b). However, Foucault's influence should not be seen as being limited to questions of colonialism and imperialism. Peet (1999:231) observes that through his genealogy, "Foucault show[s] a finely honed alertness to space, or to the way spatial relations are implicated in the complex workings of discourse, knowledge and power – hence, 'histories of power' would amount to histories 'written of spaces' (Foucault 1980:149)." Therefore, spatial dynamics of all types, including cultural, social, economic, urban, regional, developmental, political and ethnic, as well as gender, can be potentially explained through the dynamics of power. To Foucault, existing social and spatial structures are sustained by power. Again turning to Clayton (2000b:292), genealogy is to be seen as

"a sensitizing device [that] encourages a style of geographical work that is attentive to a range of problems: (a) the critical purpose of historical perspectives within geography; (b) that the geographies that geographers produce both shape and are shaped by relations of power; (c) that the production and representation of space is directly implicated in the exercise of power and formation of identity; (d) that how we think and write about the past has a central bearing on how we ascertain and disclose what is intolerable about the present; and (e) how we might draw out previously unseen spatial dynamics of domination and subjugation, inclusion and exclusion, without entrenching or proliferating their effects."

In concluding his study of Foucault, Philo (1999:231) writes what

"Foucault provides us with here is a blueprint for a truly 'postmodern' geography: a postmodern geography in which details and difference, fragmentation and chaos, substance and heterogeneity, humility and respectfulness feature at every turn, and an account of social life which necessarily brings with it a sustained concern for the geography of things rather than a recall of the formal geometries of spatial science."

2.3 Geographies of networks: Actor-Network Theory

Foucault's genealogy represents one approach to questions of geography which invokes a return to a knowledge of details. It depends upon a vast accumulation of source materials to produce what Foucault himself described as "cyclopean

monuments” (Foucault 1984:77). However, genealogy is not alone in the exploration of the details of a society. The emergence of humanist geography and its hermeneutics tradition during the 1970s was, at that time, both a reaction to what was seen as the dehumanizing nature of positivist geography (Entrikin 1976) and an alternative to the radical or Marxist geography with its emphasis on structural forces (Duncan and Ley 1982). Eyles and Smith (1988:xi) wrote that humanist geographers represented “a search for something less mechanical and more in tune with the complexity of human existence than is provided by positivism and structuralism.” Although it developed alongside behavioural geography, geographers including David Ley, Yi-Fu Tuan, Ted Relph and Anne Buttimer came to emphasize human agency in the place of the scientific methodologies of behavioural geography. Drawing upon sociology, anthropology and humanities, qualitative and interpretive techniques were absorbed into geography, broadening the scope of geographical enquiry and the focus of research away from the spatial science agenda of the 1960s and the structural agenda of the 1970s, to a focus on the social construction of place, space and landscape.

These techniques were fundamentally different to those championed by both positivists and structuralists. First, qualitative-based research privileged non-experimental, field research. Second, it focused on meaning rather than behaviour. Third, it rejected outright natural science as a model. Fourth, and in place of the scientific model, it preferred inductive, hypothesis-generating research. Finally, it acknowledged the need for reflexivity, or an acknowledgment of one’s own situatedness. This idea of situatedness takes us back to Hans-Georg Gadamer who

emphasized the situated nature of a society's framework, drawing upon the image of a vantage point in establishing an individual's, and a society's collective, horizon of understanding. In *Truth and Method* (1975) he writes:

“We define the concept of ‘situation’ by saying that it represents a standpoint that limits the possibility of vision. Hence, an essential part of the concept of situation is the concept of ‘horizon.’ The horizon is the range of vision that includes everything that can be seen from a particular vantage point.” (Gadamer 1975:269)

To Gadamer, the greatest challenge facing an individual is that of achieving a “fusion of horizons,” through which that “range of vision” could be broadened as to allow other worldviews to be acknowledged, understood and respected.

2.3.1 Ethnographic encounters

Ethnography represents one such qualitative approach. Ethnography requires the researcher to immerse him/herself into a situation or a physical location. It is characterized by the amassing of information coupled with description, observation and opinion. As such it is often described as constituting “thick description.” Whereas “thin” description as offered by statistics and aggregated summaries provides superficial description, “thick description” is seen as revealing significance (Geertz 1973). Geertz uses the example of “twitches and winks” to illustrate this difference. Daniels (1992:319) describes thick description as attempting “to make sense of the complex layers or dimensions of meaning in cultural rituals by describing them in detail from many points of view.” To Geertz, the goal of ethnography, as thick description, is to gain an understanding of the “frames of interpretation” within which an action or a behaviour acquires meaning.

It was also Geertz who introduced the notion of metaphor and the idea of “reading” a landscape. “Arguments, melodies, formulas, maps and pictures are not identities to be stared at,” he wrote, “but are texts to be read: so are rituals, palaces, technologies and social formulation” (Geertz 1980:135). These ideas have not been lost to geography. If anything, they have regained prominence with the emergence of the “post-modern” geography beginning in the mid-1980s and the re-discovery of place. The range of ethnographic techniques has since expanded to include deconstruction (cf. Harley on reading maps 1989), the reading of landscapes (cf. Bender 1992; Cosgrove 1982; Domosh 1989), the creation of narratives of place as understood as both location and consciousness or sense of place (Entrikin 1991; Hay 1998), the consideration of positionality and imaginative geography (cf. Said 1978), and finally performativity (Foucault 1980b; 1983; Law 1994).

Ethnography is not, however, to be understood as simply description; it involves a double hermeneutics, or an interpretation of an interpretation since the researcher, as an active participant in the research undertaking, always introduces some bias into the study (Geertz 1973; cf. Fortes 1945; Marcus and Cushman 1982). Any ethnographic account must be placed in its context, as David Jacobson writes

“Every ethnography involves interpretation and includes a selection of data, made more or less explicitly within a theoretical framework. Thus the picture of the people, society or culture that the ethnography presents must be understood from the perspective of (1) the question or problem that it addresses, (2) the answer, explanation or interpretation it provides, (3) the data it includes as evidence for the problem, for the interpretation, or for both, and (4) the organization of these elements (problem, interpretation and evidence) into the argument. To understand even the seemingly most straightforward ethnography, it is necessary to analyze and evaluate the argument(s) it contains.” (Jacobson 1989:2)

It should also be noted that, as with the case of all theories, ethnography and thick description are not without their critics. One, the anthropologist Paul Sandman, writes that thick description constitutes “a movement without direction, a program troubled by inconsistency, an approach that claims superiority over conventional social science but is limited by the absence of criteria for evaluating alternative theories” (Sandman in Jacobson 1989:173).

2.3.2 Actor-Network Theory as ethnography

In ethnography the researcher is urged to submerge him/herself into a locality and to develop theories based upon thick description. Actor-Network Theory seeks to extend this idiographic purpose beyond the local, to include the regional and global scales of enquiry. Nigel Thrift describes Actor-Network Theory as an exercise in “heterogeneous engineering”, “‘heterogeneous’ because it is concerned with a vision of the world as a multiplicity of different connections; and ‘engineering’ because it sees these connections as fabricated out of a diverse range of materials,” suggesting that its aim “is nothing less than an attempt to rewrite the ‘constitution’ of western knowledge” (Thrift 1999:4). As with ethnography, researchers are encouraged to immerse themselves into a dynamic world of natural, technological and socio-cultural elements and to consider this diversity as inter-connected, and in so doing, redefine how they both engage and understand the world. John Bingham and Nigel Thrift (1999) write that proponents of Actor-Network Theory, including Bruno Latour, Michel Serres, Michel Callon and John Law,

“... have sought to repopulate space and time with all the figures that have been stripped away by an idea of abstract division, by concentrating instead on movement, on process, on the constant hum of the world as the different elements of it are brought into relation with one another, often in new styles and unconsidered combinations.” (Bingham and Thrift, 1999:281)

This is to say, these proponents urge researchers to “rediscover the richness of the world” and in so doing encounter relationships that are often glossed over in modern studies. By considering the heterogeneity of the world, these proponents also suggest that Actor-Network Theory is a moralistic project of peaceable enfranchisement of the “missing masses” and “hybrids” (Latour 1992) that exist in society which have been silenced and eliminated from consideration by modernist forms of inquiry and modelling (Law 1994). Exactly who or what constitutes these “missing masses” and “hybrids” will be considered shortly.

Actor-Network Theory can, however, be a frustrating and elusive concept. How is one to apply Actor-Network Theory? Is there a specific methodology or general set of principles or steps that can allow a study utilizing Actor-Network Theory to be interpreted or reproduced in keeping with the scientific method? Nick Lee and Paul Stenner raise the nagging question of beginnings and endings — where does an actor-network ‘begin’ and where does it ‘end’? They observe, quite correctly, that “there is no necessary end to the elements that may contribute to a network, no general criterion by which Actor-Network Theory may bring an end to the list of what belongs and what is responsible” (Lee and Stenner 1999:93). This also raises the question of how one should access a network. Such openness can be interpreted as both a liability and an asset. While it can lead to accusations of subjectivity, it can provide a researcher with

the intellectual freedom to explore sets of relations and elements or variables that might otherwise have not been revealed or considered.

In the absence of theory or set method, Law (1994) suggests that Actor-Network Theory is more a sensibility, an understanding of Actor-Network Theory that is particularly revealing and appropriate. Actor-Network Theory approaches questions of social relations and their spatial expression through a de-centred, ethnographic examination of existing complex webs of relationships that connect individuals, technologies, resources and institutions within and between the local, regional and global realms and not through the imposing of Grand Narratives or Theories. As such, Actor-Network Theory does not approach social and spatial questions from the ‘top-down’ or from the ‘bottom-up’ but from within existing networks. Proponents of Actor-Network Theory suggest that both the causes of social problems and possible answers to these problems already exist within the Actor-Networks which constitute the social order of a society.

Along with this emphasis on heterogeneity and multiplicities, Actor-Network Theory also seeks to strip away the binaries that have plagued many modernist inquiries — ‘macro/micro’, ‘structure/agency’, ‘global/local’, ‘human/non-human’ — and instead, turn our attention towards flows, to a consideration of relationships and connectivities, between various actors in a network (Bingham and Thrift 1999). In doing so, Actor-Network Theory challenges the dominant Enlightenment ideals of rationalism, universalism and order, along with its resulting foundationalism. It rejects both the idea of imposing models upon reality and the ‘modern’ geographical formulation of a world

defined as a grid-like, homogeneous Cartesian surface upon which it is possible to overlay general theoretical, universalizing claims. Instead, Actor-Network Theory looks upon the world as heterogeneous and fragmentary, and challenges us to explore the multiplicity of space, place and meaning therein that, to Latour and Serres, has been removed through the “tyranny of the moderns” (Bingham and Thrift 1999; Latour 1990).

In so contesting modernity, Thrift identifies five attributes of Actor-Network Theory:

“First, it provides a means of understanding how everyday practices are transmitted into wider processes of social formation but without falling back [onto] an all-encompassing theoretical order. Second, it points to the way in which social agency is constructed in these social processes, rather than being assumed to be a property of them. Third, it identifies the process of construction as one that requires constant effort, and is always halting. Fourth, it problematises subject-object relations because of its catholic view of what can count as actors. Then fifth, and finally, it demonstrates how reality is constructed through processes of translation, association and alliance which strengthen particular positions/accounts of practices at the expense of others.” (Thrift 1996:23)

2.3.3 Intellectual origins of Actor-Network Theory

Actor-Network Theory evolved principally from the works of Bruno Latour, Michel Callon and John Law. In their hands, Actor-Network Theory was employed as a means of exploring the sociology of science and technology (SSK) through laboratory studies (Latour and Woolgar 1986 [1979]; Law 1990; Knorr-Cetina 1999). In addition to these sociological roots, Actor-Network Theory draws upon both the work of Michel Serres specifically and post-structural thought generally. Law (1994) observes that it incorporates Serres’ anthropological bent, his dismissive attitude towards the role of time and space, his suspicion of Grand Narratives, his preference for a hermetic

approach of exploration and importation, and his emphasis on objects – and especially the “deluge of objects” – and the myriad of relations they create. Its post-structural roots and affinity with ethnography is also noted by Law who writes that:

“The provenance of actor-network theory lies in post-structuralism: the vision of many semiotic systems, many orderings, jostling together to generate the social. ... It tends to tell *stories* that have to do with the processes of ordering that generate effects such as technologies, *stories* about how actor-networks elaborate themselves, and *stories* which erode the analytical status of the distinction between the macro- and micro-social.” (Law 1994:18)

Actor-Network Theory has since slowly drifted from these roots into other disciplines and a broader range of enquiries that include studies of technology development (Law and Callon 1992; Bijker 1992; Akrich 1992), technology transfer (Akrich 1992; Law 1994; Law and Mol 2001), patents (Bowker 1992), and health studies (Pinch, Ashmore and Mulkay 1992; Law 1994), as well as analyses of the capitalist marketplace and financial networks (Callon 1999; Thrift 1996), and in agri-food network analyses (Raynolds 1997; Page, 1997; Marsden 1997; Boyd and Watts 1997; Whatmore and Thorne 1997).

2.3.4 What, then, is Actor-Network Theory?

Not surprisingly, Actor-Network Theory is understood as consisting of actors – or more precisely actants – and networks. These *actants*, however, are not simply human actors. There are many others, including technological, natural, even intellectual actants, that become associated through their enrollment into networks. These are the “missing masses” and “hybrids” of Latour which were mentioned earlier. The *networks* of Actor-Network Theory differ from the conventional understanding of the term as well. These are not to be understood as networks in the sense of modern telecommunication

networks along which information is transported unchanged, nor networks commonly examined in industrial studies that retain a dichotomy between human actors and technological systems (Latour 1999a). Networks in Actor-Network Theory involve change, or what Latour calls “translations” or “transductions” (Latour 1999a), an idea shared by both Gregory in his criticism of systems analysis and by Wasserman and Faust in their examination of social network analysis. Thrift understands Actor-Network Theory to be a “sociology of ‘translation’ where translation is defined as the ‘mechanism by which the social and natural worlds progressively take form’ (Callon 1986:224)” (Thrift 1996:23; cf. Callon 1991; Latour 1983, 1987, 1988, 1993; Law 1991, 1994).

Actants are quite different from ‘human actors.’ The idea of agency is not necessarily a defining trait of an actant. Something becomes an actant because it simply influences, or acts, upon the other actants that make up a network. Actants undergo translations by being constituents of a network because of their interaction with other actants. Each actant can therefore be seen as a set of relational effects defined within a network. This is even true of human actors. To Law, for example, “people are who they are because they are a patterned network of heterogeneous materials” (Law 1992:380), continuing,

“Is an agent an agent primarily because he or she inhabits a body that carries knowledges, skills, values and all the rest? Or is an agent an agent because he or she inhabits a set of elements (including, of course, a body) that stretches out into the network of materials, somatic and otherwise, that surround each body? ... [Actor-Network Theory] does not deny that human beings have to do with bodies or that humans have an inner life; it insists that social agents are never located in bodies and bodies alone, but rather that an actor is a patterned network of heterogeneous relations.” (Law 1992:382)

Ecosystems, for example, consist of actants that both serve to define the ecosystems and are defined by that system and the other constituents therein. Similarly, a nation-state can be seen as being made up of not only people, but also nature, technology – telephone systems, text and geographical triangulation points that bind the nation together – and socio-cultural actants including language and history that together define a nation-state (Law 1999). Therefore, while actants form the network, the network also makes the actants (Thrift 1996). Returning to Latour, an “‘actor’ is not here to play the role of agency and, ‘network’ to play the role of society; [instead] actor and network ... designates two faces of the same phenomenon, like waves and particles” (Latour 1999:18). It is, in reality, impossible to separate the two, leading Mike Lynch to suggest that Actor-Network Theory should instead be called an ‘actant-rhizome’ ontology in acknowledging the similarities with Deleuze and Guattari’s conceptualization of the rhizome (Latour 1999).

The multiplicity of actants, and their myriad of relationships, create the heterogeneous world. Concomitantly, it is because the world is chaotic and heterogeneous that Actor-Networks exist, form and dissolve. Law writes, “Machines, architectures, clothes, texts – all contribute to the patterning of the social world. And ... if these materials were to disappear, then so too would what we sometimes call social order. Actor-Network theory says, then, that order is an effect generated by heterogeneous means” (Law 1992:384). Just as reality is heterogeneous, so are the networks of relations within that reality and the complex ‘social’ sets of relations in any society are the outcomes of these relationships. Thus, as Thrift observes in citing

Callon, “in Actor-Network Theory, ‘modes of production,’ ‘structures,’ ‘classes,’ ‘interests,’ and the like are not treated as the carriers of events, but rather as a set of effects arising from a whole complex of network relations” (Thrift 1999:24). In this sense, Actor-Network Theory represents another approach that turns structuralism upside down. Whereas structuralism looks for those underlying foundational relationships that determine social relations, Actor-Network Theory considers the heterogenic nature of network relations that, in turn, produces a heterogeneous world of social relations and structures. It is through Actor-Networks that structures are established and not the structures that create the Actor-Networks.

Law (1994) concludes that Actor-Network Theory is therefore a sociology of ordering rather than order; it is about how things are done in practice and not simply the outcome of practices. Actor-Network Theory therefore does not necessarily look at the sites of inequality or violences, but rather at the networks which lead to inequality, unfairness, and violences. It does not necessarily look at centres of political or financial power as causes of social structure and relations, but rather the networks that created and sustained these centres. It considers how these situations emerge through practice or what he terms, performance.

Actor-Network Theory is therefore to be understood as consisting of three principal characteristics. First, it consists of actants that can be human and non-human, which are “relational effects” and “contingent achievements” (Thrift 1996:24). Second, there is a network that is defined by the actants and by the circulation of intermediaries through which a network is sustained. Third, actants and networks are really aspects of the same

complex. As Thrift (1996:221) concludes, “Actor-Networks are associations of actors and resources (intermediaries like texts, human and non-human beings and money) which are put into circulation in a continual effort to construct and maintain power relations. They are performative definitions of what society is about.”

2.3.5 Questions of stability and power

There is no guarantee that a specific network will continue to exist for any set period of time. Within a heterogeneous world, networks are constantly changing, expanding or contracting, as actants enlist or withdraw from them. There is “no version of the social order, no organization and no agent is ever complete, autonomous and final” (Law 1992:). The social arena is thus a site of struggle and resistance as much as it is a site of ordering, raising the question of stability. Simply put, if the world is in a state of constant flux, how do such networks, and the social and spatial relations that emerge from them, become stable and identifiable? How do societies retain a degree of stability?

Stabilization is possible for periods of time through two means. The first involves how actants in a network become aligned. The second has to do with a network’s size.

Considering how actants become aligned, Johnathan Murdoch explains:

“In order for an actor to successfully enrol entities (human and non-human) within a network their behaviour must be standardised and channelled in the direction desired by the enrolling actor. This will entail redefining the roles of actors and entities as they come into alignment, such that they come to gain new identities or attributes within the network. It is the intermediaries which act to bind actors together, ‘cementing’ the links. When there is a perfect translation, or redefinition, of actors’ identities and behaviours, then these are stabilised within the network. The stronger the network, the more tightly the various entities (human and non-human) are tied in. ... The more stable the network, the more irreversible the translation. The links and relationships would be predictable, standardised; the network would be “heavy with norms” (Callon 1991:15). When the translation process has been weakly executed, the enrolling actors find their states continually in question and find it hard to mobilise other parts of the network.” (Murdoch 1995:747-748)

This refers back to the idea that actants are defined within a network. This explanation should not lead one to conclude that an enrolling actor must have agency. Take, for example, the enlisting of men and women into the military. The military tradition is the enrolling or organising actor that standardizes and channels the behaviour of enlisted personnel.

Nevertheless, it does point to the importance of power in the organising and perpetuation of a network. Power, here, is to be understood as a continuous outcome of the strength of associations between actants in a network. This power is similar to that of Foucault's, perceived "as a concealed and misrepresented effect, rather than as a set of causes" (Law 1992). The organizing actors can be seen as the ones who 'control' the power at a particular moment in time and place. Again turning to Murdoch,

"The stronger the network the more powerful the translating actor. Thus, those who are powerful are not those who 'hold' power but are those able to enrol, convince and enlist others into networks on terms which allow the initial actors to 'represent' these others. Powerful actors 'speak' for all the enrolled entities and actors and control the means of representation (they 'speak for the others that have been deprived of a voice, that have been transformed from objects that spoke for themselves into new shadows of their former selves (Law and Whittaker 1988:79)). The controlling actor grows by borrowing the force of others; it can inflate to a larger size ... Power is, therefore, the composition of the network; if it lies anywhere, it is in the resources used to strengthen the bonds." (Murdoch 1995:748)

Callon seeks to clarify this in writing that "what sociologists generally call power relationships means describing the way in which actors are defined, associated and simultaneously obliged to remain faithful to their alliances" (Callon 1986:224).

Nevertheless, it is important to note that not all networks necessarily have organising actors, or that such organising actors necessarily need to be human actors. Nor does a network necessarily have only one organising actor; several can be operating

simultaneously in a network. Finally, an organising actor is never truly secure. That actor can be replaced as networks shift and change. As Law observes, “Agency, if it is anything, is a precarious achievement” (Law 1994:101).

The size of the network itself also helps to determine a network’s stability. However, as Latour observes, size is not a question of importance of the individual actants — the status for example, of the individuals enrolled in the network — but it is rather a function of the reach of a network and its internal set of relations. Big does not mean ‘really’ big, or ‘overall’ or ‘over-reacting;’ it does not refer to differences of scale, or the importance of individuals enrolled in the network. Rather, it refers to a network’s connectivity, how many actants have been successfully enrolled in the network and what form these actants have assumed (Latour 1999).

An aspect of this stability is the *vitality of a network*. This is reflected in the ability of a network to extend itself spatially, or what Latour described as lengthening. Sarah Whatmore and Lorraine Thorne describe this lengthening as consisting of “the mobilization of larger numbers and more intricately interwoven constituents, or mediators, to sustain a web of connections over greater distances” (Whatmore and Thorne 1997:291). From this vantage one can suggest that capitalism is sustained and perceived as stable because of the sheer scope of its networks and its recruiting of actants not only from within a society’s financial and economic activities, but also from political (through its association with the principles of democracy and individual rights) and social (through its association with the principle of freedom) sources.

Strong networks make it possible to *act from a distance*, an idea of great importance to Actor-Network Theory. This ability is achieved through intermediaries, or through what Latour calls “*immutable mobiles*” — actants that are mobile, immutable and durable (Latour 1999). Such objects, Whatmore and Thorne write, “are objects which encode and stabilize particular socio-technological capacities and sustain patterns of connection that allow us to pass with continuity not only from the local to the global, but also from the human to the non-human” (Whatmore and Thorne 1997:292). These can include, in addition to humans, such things as currency, maps, treaties, laws, letters of introduction, oaths of allegiance, contracts and rules of conduct that organize socio-economic and political activities. These can also be postal systems, long-distance navigational methods and modern computerized telecommunications systems that allow centres (or organising actors located in specific sites) to exert influence into the peripheries (or into distant places and spaces).

2.3.6 The question of centres

What, then, is acting from a distance? Usually it is a centre of some sort. Proponents of Actor-Network Theory speak of centres of calculation and of organising centres. This is an extension of sociology of scientific knowledge studies. Centres of power can be added to this set of centres. Each of these types of centres acts upon the network, and actants, in different ways. Each is populated by a variety of actants, too. It is therefore important to recognize that centres of calculation, centres of ordering, centres of power are not necessarily synonymous. They can, and do, emerge independently of each other and subsequently ‘negotiate’ their relations. Furthermore, these centres are both social

and spatial. Using cartography as an example, there are centres of calculation wherein cartographic techniques are developed and applied, organising centres where maps are physically created, and centres of power where decisions concerning what is to be included on maps is determined.

2.3.7 The Portuguese spice trade, or there and back again: a case study of Actor-Network

In one of the earliest applications of Actor-Network Theory to what might be considered a geographical subject was Law's 1986 study of the Portuguese spice trade, *On the Methods of Long-Distance Control: Vessels, Navigation, and the Portuguese Route to India*. In this examination, Law focuses on the nature of long-distance control, arguing that this "depends upon the creation of a network of passive agents (both human and non-human) which makes it possible for emissaries to circulate from the centre to the periphery in a way that maintains their durability, forcefulness and fidelity" (Law 1986:234)

Portugal's situation in the fifteenth century, if not dire, was certainly precarious. Surrounded and overshadowed by a powerful neighbour in Spain, the Mediterranean dominated by Italians in the west and by Muslims in the east, Portugal of the fifteenth century had no outlet open to her except the Atlantic Ocean. But, to Law, the consequences of these circumstances were momentous. The Portuguese attack and capture of the Moorish seaport of Ceuta in 1415 marked the start of the Portuguese advance down the African coast and around the Cape of Good Hope and into the Indian Ocean, an advance which culminated in the bombardment of the Samorin of Calicut and

a naval victory against a powerful combined Gujarati and Egyptian fleet at Diu in 1509. This final victory provided the victorious Portuguese a stranglehold on the vital Indian Ocean spice trade — the *Carreira da India* — which had previously been monopolized by Muslim sailors.

The history of Iberian expansion during the 15th and 16th centuries has been examined applying themes of imperialism, military and political strategies (Diffie and Winius 1977; Boxer 1969) and of economics (Magalhaes-Godinho 1969). Scholars of maritime history have examined advances in ships, in methods of navigation and the impact of the cannon. One scholar, Chauni (1979), has also examined the technology associated with Portuguese expansion. Law, however, argues that the technological, the economic, the political, the social, and the natural had to be considered together as an interrelated complex of network relationships, in order to fully understand this successful extension of Portugal. Furthermore, it had to be considered from the viewpoint of a network that included not only kings and merchants, but also sailors, astronomers, navigators, soldiers of fortune, astrolabes and astronomical tables, vessels and ports of call, winds and currents – people, artifacts, knowledge and nature all mixed together.

Law poses two inter-related questions. First, how did these various actants come to form a network through which control of the Indian spice trade was achieved? Second, how was it perpetuated? These two questions can be reduced to a seemingly simple one: how did a small number of people in Portugal influence events on the far side of the world, through which they secured vast wealth? One aspect essential to the success of

the network was the capacity to enforce compliance. It was necessary to keep the seamen, merchants, master and envoys in line and to make use of their efforts for the *Carreira* to work. This was achieved through two means: nationalistic arguments extolling loyalty to king and country representing one of Latour's immutable mobiles, and the lure of wealth. However, the success of the network did not depend solely upon people; there were also important technological actants that changed the nature of Portuguese sailing vessels, extending their range from coastal waters to open seas.

One set of technological actants centred on Portuguese sailing vessels. Medieval European sailing vessels were severely limited by their design in terms of their range and durability, their carrying capacity which was small, their ability to handle in adverse weather and their ability to sail out of sight of land or soundings. Such vessels were designed for sailing in the Mediterranean, in the Baltic and in coastal waters. To control the Indian Ocean spice trade, the sailing vessels would have to travel further, venturing into more hostile seas. They would need to be larger with greater mobility and structural integrity.

The mainstay of the *Carreira* was the carrack, a vessel developed in response to the challenges of southern expansion that was to become the "perfected transport ship" (Law 1986). Its hull was broad, heavily built and powerful, designed in the carvel fashion with large castles located both fore and aft. The vessel had three or four masts — a small foremast, the main mast, the mizzen mast and, sometimes, a bonaventure mizzen. This combination of square and triangular lateen sails provided it with versatility in the face of a range of different wind conditions. Associated with these

vessels were other adapted technologies including the *cannon* and improved methods of *rigging* sails. The incorporation of cannon helped to make the carrack virtually impregnable to attack by boarding from small craft, one of the normal hazards of the Eastern trade. The improved methods of rigging resulted in smaller crews. The basic dimensions of these vessels enabled them to carry a great deal of cargo, both supplies for the crew and goods for trade, minimizing stops along routes. By the sixteenth century, the carrack was the workhorse of the *Carreira*.

An improved sailing vessel was not, in itself, the reason for the success of the *Carreira*. There were also important intellectual actants, which were crucial to this Portuguese network, that specifically dealt with matters of navigation. Medieval European navigation depended essentially upon dead-reckoning, the magnetic compass and assembled information organized in the pilot's book or rutter. The Mediterranean navigator used his rutter in combination with a portolan chart to determine an appropriate course between two ports. Such charts are laid out around wind roses and rhumb lines of constant magnetic bearing. The navigator determined the bearing of his course by looking for an appropriate rhumb line coming from a convenient wind rose or if there were none, he would use rulers and dividers to determine course and the distance to be run by measuring this off the chart and/or by consulting his pilot book. If tacking was necessary, the navigator would use a set of *marteloio* tables developed over hundreds of years. In north-west Europe, navigators depended less upon charts but made use of magnetic compass and rutters, together with soundings of coastal waters using a lead and line to gauge depth. To stray out of known waters risked disaster.

The same could be said for the carracks. Although they were more durable and mobile, they potentially remained trapped within a particular sailing regime by a mode of navigation dependent upon dead-reckoning. This was, however, already in a state of transition by the fifteenth century, initiated decades earlier by Henry the Navigator. Astronomers, mathematicians, map-makers and seafarers gathered at his court, known as the Academy of Sagres. At the same time that the Portuguese were continuing their miniature crusade against the Moors in northern Africa, Portuguese sailors were pushing southwards along the African coast, extending their knowledge of the African coastline as well as conducting systematic observations of the angular altitude of the Pole Star, Stella Maris. As a result of these diverse efforts that spanned decades, Portuguese navigators by the 1480s not only used the Pole Star but also drew upon measurements of the altura of the Sun and the Southern Cross for sailing in the southern hemisphere. As a final important step, this information was next organized into tables for use on the carracks – one of Latour’s immutable mobiles – that was to be reproduced in the *Regimento do Astrolabio et do Quandrante* – which was to lay the foundation of modern astronomical navigation.

Further complementing these advances in celestial knowledge was the creation of practical, simple instruments of measurement for use on the seas — a simplified astrolab and quadrant scaled back to provide only the fundamentals for measurement. These new, mobile technological actants, coupled with observation tables, marked a major breakthrough in sea navigation, constructing what Law described as the essential envelope within which global mobility and communication was possible.

Also in keeping with the dynamics of Actor-Network Theory, these technological and knowledge actants, in turn, acted upon the human actors. The simple data and the simple instruments were supplemented by systematic training of navigators, for example, at least from the turn of the sixteenth century with the establishment of the what can be described as a scientific centre, the *Casa de Guinea e India* in Lisbon. However, it was not only the navigators who were transformed. The new vessels and the presence of cannon also transformed the crew of the carracks, introducing new duties, skill sets and expectations.

To Law, the challenge facing the Portuguese was “to build a navigational envelope for their vessels that made mobility and undistorted communication between Lisbon and India possible” (Law 1986:234). This ultimately involved not only human actors, but also technological and knowledge actants, as well as immutable mobiles through which it is possible to act over distances. First, there was the carrack along with the right kinds of people and instrumentation on board that created a vessel capable of successfully undertaking the physical voyage to India, and more importantly back, and with the capacity to carry out the trade. Second, there was the *Regimento* — that included The Rule of the North Star, The Regiment of the Sun, the Rules for Raising the Pole, the tables of solar declination, and the latitude of possible points of destination — all of which was reproduced in text form thereby becoming mobile, durable, yet also capable of exerting force upon that environment. Third, there were the new instruments of navigation, the re-designed astrolabes and quadrants, which were also mobile and relatively durable artifacts for use onboard of the vessels. Fourth, there were the

transformed navigators and crews. Fifth and finally, there was an organization that trained the transformed navigators.

What is absent from Law's examination of the Portuguese spice trade is a consideration of centres. Although the emergence of *scientific centres* was incorporated into his analysis – the Academy at Sagres and the *Casa de Guinea e India* in Lisbon, what is missing from his analysis is an examination of the *centres of power*, principally that of the Portuguese Court, the political centres of India and the principal offices of the *Carreira da India* in Lisbon, as well as *centres of organization* including ports in both Portugal and India. From a geographical point of view, these physical and socio-political centres potentially provide valuable insight into the dynamics of the *Carreira da India* and the resulting spatial organization that bound Portugal and India. Despite this gap in his analysis, Law's treatment of the Portuguese spice trade is important insofar as it clearly illustrates how a network forms and lengthens through a complex network of “documents, devices and drilled people” (Law 1986:258) ultimately becoming identifiable as a stable set of relations for a period of time before it is itself usurped by another European imperial network.

2.3.8 A theoretical understanding of Actor-Network Theory

Actor-Network Theory begins with the recognition that reality is heterogeneous and is populated by a myriad of human, natural, technological and socio-cultural actants. These actants form networks through which, as Callon observes, “the social and natural worlds progressively take form.” Actor-Network Theory engages this world in a de-centred ethnographic manner that seeks to reveal the various networks of actants that

exist. Actor-Network Theory is therefore afoundational, insofar as it seeks to avoid the temptation to impose some framework of order through which the world becomes knowable.

The term Actor-Network is not to imply a dichotomy; in reality, they are, as Latour writes, “two faces of the same phenomenon.” Actants are to be understood as “relational effects” or “contingent achievements” defined by the networks in which they exist. Similarly, networks are defined by the actants and the circulation of intermediaries through which stability is achieved.

The stability of these networks depends upon the alignment or subscription (or translation) of its constituent actants, and the size of the network, as understood by its connectivity. A network’s size, in turn, raises the question of its vitality, or its ability to enrol and retain increasing numbers of actants. This is what is meant by lengthening. Strong networks make it possible to act from a distance and extend themselves through the use of intermediaries described by Latour as immutable mobiles. This also raises the question of power. Power is understood more in Foucaultian terms and originates in what Murdoch describes as “the composition of the network.”

In his study of the Portuguese spice trade, Law illustrates the diverse nature of actants, how these act upon the other constituents, and how in their convergence these create a stable network that is both social and spatial in nature. Secondly, his work illustrates the dynamic nature of networks. Most of the critical actants of the emerging *Carreira da India* were new innovations suggesting that network enrollment is not simply passive, but can be a creative and driving force. Thirdly, the study clarifies the

meaning of acting from a distance. The ability of the *Carreira da India* to extend itself, and Portuguese power, is, as Law suggests, best explained not through any single model or discourse (be this imperial, military or economic in nature) but rather through an ethnographic approach in which the technological, the economic, the political, the social, and the natural are considered as an interrelated complex of network relationships. This early application of Actor-Network Theory to a geo-historical study provides both a concrete example of Actor-Network Theory and highlights certain features of this theory. These features include the nature of the actants and how their act upon each other, how networks seek to lengthen themselves thereby achieving greater stability, and how different non-economic actants can serve as the organising actants for a network.

Modelling? Modelling what? Closing Thoughts to Part I

At the outset of this Part, I suggested that, in an effort to gain an understanding of reality, we necessarily create frameworks, models and systems which, by their nature, simplify or abstract the complexities inherent in that reality. Each of us filters vast amounts of information through our physical senses, through the application of rational thought and through our imaginations. We construct our world and give it meaning, drawing upon society's *stocks of knowledge* and our own abilities to do so.

Models are a necessary means through which the world is made more comprehensible. The relevancy of modelling is, therefore, not the issue; the modelling of relevancy is. What are questions of relevance and how are these established? What modelling approaches are determined to be relevant? What variables, gleaned from reality, are determined to be relevant? Finally, and perhaps most importantly, what is the significance given to the knowledge derived from exercises in modelling?

Even prior to the Enlightenment Period, the Western intellectual tradition has been founded upon a belief in some underlying order of reality that is knowable, and a belief in progress towards some knowable end. Beginning with the Enlightenment, and perpetuated within modernity, these co-joined beliefs of order and progress have become dependent upon a knowledge that is presented as objective, neutral and universal, or 'scientific.' Since the articulation and acceptance of a mechanistic

universe, Western scholars have sought to create similar structures to explain social dynamics and even the human being. The Modern *mentalité* would have us search for foundational truths, "true everywhere, for all time and of everyone."

In the case of modern geography, this has led to a series of paradigm shifts that have transformed the discipline from a dominantly idiographic to a dominantly nomothetic discipline. This, in turn, has led to the adoption of methods and techniques for modelling reality that seek relational explanations instead of descriptive explanations, moving progressively from causal speculations about human-environmental relations at the turn of the last century, to the spatial science of the Quantitative Revolution of the 1950s and 1960s, to the Marxist-inspired structuralism and application of political economy theory to geographical questions beginning in the 1970s.

Yet, as it is argued, as scholars have searched for universalizing foundations to explain reality, they have moved towards ever increasing levels of complexity to the point where even chaos and unpredictability have been incorporated into models, thereby making any sort of foundational claims questionable. This is the conundrum of modernity. Despite attempts to devise universal truths, modern enquiry has come face-to-face with an apparently irreducible heterogeneity. Even the simple acknowledgment of human agency would seem to challenge the deterministic nature of foundationalism.

At no point during the preceding discussion, however, has it been suggested that geographers abandon modern modelling, whether these models are positivist, structural or behavioural in nature. It has been argued that there is a need to pay closer attention to the interpretation of these models: how they are defined and formulated, what variables

are selected as being relevant to the question being addressed and, most importantly, the importance we place on the knowledge of relationships derived from modelling. There is a need to reaffirm that any model provides not only an incomplete picture of reality but that this picture is inherently biased.

The dilemma facing modernity is its continued quest for absolutes, for foundations, upon which to understand and organize reality. Not all thinkers have subscribed to this 'Enlightenment Project.' There arose, for example, various counter-Enlightenment movements during the late eighteenth and early nineteenth centuries which raised concerns over the "alienation caused by the objectification of humanity and the division from nature which the mainstream view entailed" (Roebuck 1999:25) and the notion of uniformitarianism. They proposed, as an alternative, an expressive and morally-free humanity. Proponents of expressivism "saw human life [as] possessing expressive unity analogous to a work of art, where every aspect found its proper meaning in relation to all others and thought each life unique" (Roebuck 1999:25). To Berlin, Johann Gottfried von Herder was the most influential of the Expressivists, writing that "all regionalists, all defenders of the local against the universal, all champions of deeply rooted forms of life ... owe something, whether they know it or not, to the doctrines which Herder introduced into European thought" (Berlin in Roebuck 1999:25), ideas that included nationalism and pluralism along with expressivism which challenged mainstream Enlightenment philosophical monism.

This skepticism exists today as well. Whereas to Jürgen Habermas the Enlightenment Project held, and continues to hold, the optimistic promise of

advancement and progress, to Adorno and Horkheimer (1973), it was the preamble to the horrors of modernity as expressed by Nazism. Yet, even to Habermas, the hegemonic position of science in modern society is problematic. Drawing upon the heritage of the Frankfurt School and its critical theory, Habermas was critical of the emerging scientism which he described as “science’s belief in itself; that is the conviction that we can no longer understand science as one form of possible knowledge, but rather must identify knowledge with science” (Habermas 1979:4). In so doing, other forms of knowledge were discounted and rendered, in some cases, inconsequential.

To Foucault, the recovery of discounted knowledges, or what he termed subjugated knowledge, is crucial to challenging the Modern *episteme/dispositif* and the homogenizing imperative of modernity. In so doing, he joins with feminist, post-colonial and post-structural scholars who have all raised questions of Otherness, marginalisation and heterogeneity in an effort to carve out spaces where alterity is revealed.

Foucault’s geography consists of three important aspects: first, the nature of power in the creation and perpetuation of social and spatial organization; second, a vision of the world as being heterogeneous; and finally, the nature of those things that populate this heterogeneous world as being of equal importance. Foucault encourages us to stop searching for absolute structures of underlying order and explanation upon which society is based, and instead consider the dynamics of power relations and how these constitute social and spatial relations. As such, Foucault provides us with an alternate approach to questions of geography. However, power as understood by Foucault is not,

itself, foundational. There is no single form of power operating in any given society or place at any given moment in time. Ultimately, power is understood, as Clayton writes, as a “‘force field’ of strategic relations” that exists through action. Power is performative, consisting of actions that influence the actions of others. To understand social and spatial dynamics, therefore, one must consider the dynamics of power operating within the social and physical setting.

Foucault sees the world as heterogeneous. In his analysis of heterotopia, an alternate approach to engaging the world is suggested, one on which heterogeneity is acknowledged as, to refer back to Law, irreducible. To Hetherington, heterotopia is understood as “space-between,” “spaces of deferral,” or “places of Otherness, whose Otherness is established through a relationship of difference with other sites, such that their presence either provides an unsettling of spatial and social relations or an alternate representation of spatial and social relations” (Hetherington 1997:8). In this interpretation, Otherness has to do with different modes of ordering, rather than simply a contrast between order and resistance, between hegemony and marginality. It considers networks that span across time and space, linking places, people and things at the local, regional and global scales.

Heterotopia exists not only on the ‘margins’ of a society, but throughout that society. Actor-Network Theory seeks to reveal this heterotopia through networks interspersed throughout society. However, Actor-Network Theory is fundamentally different from the systems analysis and network analysis first explored by positivist geographers during the 1960s and early 1970s. Nigel Thrift describes Actor-Network

Theory as an exercise in “heterogeneous engineering.” Through Actor-Network Theory, the social world is understood not as the product of underlying structures, but as an outcome of networks. Indeed, it has been suggested that what are seen to be the underlying structures or foundation of a social superstructure are actually the product of networks. To refer back to Callon, “in actor-network theory, ‘modes of production,’ ‘structures,’ ‘classes,’ ‘interests,’ and the like are not treated as the carriers of events but rather as a set of effects arising from a whole complex of network relations.”

However, Actor-Network Theory differs from the modern understanding of systems analysis in several important ways. First, there is the nature of the actants that form networks. These are understood to include not only human actors, but other life, technology and even ideas. The dichotomy between human actors and the rest of Latour’s “missing masses” and “hybrids” is erased. Actants are actants because they act upon other constituents of a network and are, in turn, acted upon. Networks in Actor-Network Theory differ from the common understanding of networks, such as communication or transportation networks, insofar as actor-networks necessarily contain change. Actants change due to their relationships or alignment within a network.

This raises an interesting interpretation of power. As Murdoch observed, power comes from within the network. As such, Actor-Network Theory incorporates a Foucaultian power. However, unlike Foucault, non-human actants can exercise power. A network can have an organising actor, or several, and these actors gain power through the enrolling of other actants and ‘speaking’ for these actants.

When one speaks of networks in Actor-Network Theory, one speaks of the alignment of enrolled actants and the size of a network when considering stability; one speaks of the vitality of a network and lengthening through the enrolling new actants and its ability to act from a distance through immutable mobiles. Proponents of Actor-Network Theory do not speak of a single network, but rather a plurality of networks operating within the world. Proponents of Actor-Network Theory, therefore, opt to approach questions of geography from an ethnographic vantage point, exploring alternative forms of social and spatial networks which already exist within this heterogeneous world for answers to existing social questions.

Is there a role for Actor-Network Theory in geography? I would suggest that there is, for several reasons. First, Actor-Network Theory represents one approach through which the idea of Grand Narratives is shattered. Indeed, Grand Narratives are revealed for what they truly are — powerful, highly durable networks that have succeeded in enrolling many actants into these networks in our time period. Second, Actor-Network Theory permits us to explore already existing alternatives — subaltern knowledges and networks — through stories of relations in the quest for answers to existing questions whether these be of economic or social justice. Furthermore, Actor-Network Theory exposes alternate spaces not simply in non-Euro-American spheres (Others), but within our own society. As such, it forces us to consider what other forms of social and spatial relations are already in existence but have been submerged beneath the weight of modernity. It further raises fundamental questions concerning ‘truth.’ Third, Actor-Network Theory forces us to look beyond humans; to consider the fundamental place of

technology within society, social actions and spatial realities. Fourth, the raises the possibility that ideas can act as organising actants offers exciting possibilities. Does Actor-Network Theory represent one approach through which it is possible to re-introduce an ethical landscape into geography? Is it possible through Actor-Network Theory to expose moral spaces? Fifth, and finally, Actor-Network Theory reminds us that we operate with incomplete knowledge — we do not know everything — and as a result we should be more receptive to other approaches and ideas.

Part II

Modelling Approaches to Understanding Globalised Agri-Food

Michael Watts and David Goodman (1997:1) describe the 1990s as a period of “unprecedented deregulation of agriculture” during which time “export-oriented neo-liberal development strategies,” emphasizing trade instead of aid were championed, and there emerged a general consensus “that globalisation of the world agro-food economy was proceeding apace.” These dynamics remain very relevant today. Agriculture is continuing to undergo fundamental restructuring on a global scale. This restructuring – what types of commodities are produced, where and how, and the subsequent impact on social structures of rural and urban communities, and of nations in general – is most often considered in the context of globalisation.

While this restructuring is leading to fundamental changes in the countryside of every nation, it should not, however, be seen as limited simply to the farm scape. Associated restructuring of post-farm food production – the types of foods being manufactured and the means by which these new foods are processed, packaged, distributed and retailed – has led to the extension of what were once essentially domestic food systems globally, and the emergence of what Harriet Friedmann (1993)

termed ‘global agri-food complexes,’ Ben Fine *et al.* (1996) ‘systems of provision,’ and William Friedland *et al.* (1991) ‘global commodity systems.’

The outcome of this globalisation remains uncertain. Certainly globalisation brings with it visions of George Ritzer’s (1996) “McDonaldization” and, as Friedmann writes, the danger of “private global regulation” in which transnational corporations “are the major agents attempting to regulate agro-food conditions, that is, to organize stable conditions of production and consumption which allow them to plan investment, sourcing of agricultural materials, and marketing on a global scale” (Friedmann 1993:52). Such fears are seemingly justified with the emerging organization of globalised corporate networks, and studies indicating that an increasing percentage of world trade is now internalized in transnational corporations (Watts and Goodman 1997). Yet, perhaps paradoxically, the trade liberalization that lies at the heart of globalisation is seen by some as leading to new forms of regionalism resulting in the creation of new economic spaces that also potentially represent a step towards larger scale and more integrated economic and political spaces (Troughton 1991). To still others, this trade liberalization is seen as potentially liberating, opening up exciting new spaces for alternative networks linking farmers, processors, retailers and consumers around non-economic principles (Whatmore and Thorne 1997).

Questions concerning agriculture, therefore, can no longer be restricted to any national stage, or directed at the actions of any single or group of nations at the international level. Nor can these questions focus solely on farmers and their interests. Today, these questions concern a wide range of actors, from manufacturers of inputs

(agro-chemicals, feeds, seeds, equipment), shippers, processors/ manufacturers, wholesalers, retailers, importers/exporters, even consumers as well as farmers, and must address the concerns of these divergent interests. The complexity of modern food fabrication is reflected in the very terms used to describe it, as the *agricultural industry* is now understood as the *agri-food sector*, emphasizing the economic inter-relationships linking on-farm and off-farm interests. In this transformation, farmers have become only one 'voice' – a voice that is often marginalised by other interests within society – and agri-food issues have become incorporated into other, broader debates within society, such as current debates over the ethics of biotechnology, the principle of sustainability, the principle of bio-diversity and the issue of global warming.

What is certain is that methods and practices associated with the fashioning of food products are more complex today than at any other time in history and this has led to a profound change in the way agriculture and food production are understood. Confronted by both spatial and structural changes, the agri-food complex is seen in much of the current literature as simply another economic sector in a nation's economic structure. Yet, the agri-food sector is a complex sector with its own unique history and meaning beyond simple economics. Food is also an integral part of a people's culture; it has social meaning too. As Minz writes,

"Eating is never a 'purely biological' activity. ... The foods eaten have histories associated with the pasts of those who eat them; the techniques employed to find, process, prepare, serve and consume the foods are all culturally variable, with histories of their own. Nor is food simply eaten; its consumption is always conditioned by meaning. These meanings are symbolic." (Minz 1996:xx)

How, then, can one model the agriculture and food production system, or the agri-food complex, that has evolved in a manner that reflects its myriad of interests and meanings? What do differing approaches to modelling “tell” us about the processes of globalisation as these relate to food? Do different modelling approaches lead to fundamentally differing understandings of globalisation and the internationalization of agriculture and food and, if so, what are the consequences of selecting one form of analysis over another?

The purpose of the second part of this thesis is to build upon the theoretical musings set out in part one. This will be done by considering three different approaches to modelling global agri-food: the first, a structuralist viewpoint employing regulatory theory and, more specifically, Richard Le Heron’s globalisation perspective; the second, a Foucaultian sketch of globalised agri-food; and the third, an application of Actor-Network Theory. In this exercise, the essential goal is to identify what differences in understanding emerge from these approaches. More specifically, it is hoped that this comparison will reveal what these forms of modelling privilege in terms of Rorty’s “representations, expressions and processes” as discussed in chapter one, what are omitted, and the understanding of globalised agri-food associated with each. A word of caution should be made at this point. Although there exists a significant body of literature drawing upon Regulation Theory and globalised agri-food, there is no such literature applying either Foucault or Actor-Network Theory. Consequently, the chapters dealing with Foucault and Actor-Network Theory will constitute more sketches than analyses.

Chapter 3. The Globalising Agri-Food

As recently as twenty years ago, farming was still understood as operating under different sets of rules than industrial capitalism (cf. Newby 1982). This was due, in part, to the nature of agricultural production (for, as Goodman, Sorj and Wilkinson [1987] observe, “agriculture confronts capitalism with a natural production process”) and, in part due to its social significance in most nations. In this orthodox view, agriculture was most often examined in the context of a nation’s history, its demographic structure and its cultural fabric, and questions relating to farming were inextricably interwoven with questions of rural stability and national priorities, particularly that of food security.

Both the organization of agricultural production and the demographic structure of most industrialized nations of Western Europe and North America have changed dramatically since the Second World War. In the nearly sixty years that have passed since the end of that war, large-scale industrial farming has effectively replaced the small-scale family farm in much of the industrialized world and increasingly within the industrializing world (Goodman and Redclift 1991; Goodman and Watts 1997).

Beginning in the 1970s, and gaining momentum during the 1980s, how agriculture and food production was studied changed as well, focusing upon this industrialization of agriculture and its integration into increasingly complex webs of relationships with other sectors of the economy. Adopting the theoretical framework of political economy,

a significant body of research in geography, sociology and other fields of academic inquiry appeared beginning in the 1980s that saw agriculture not from the standpoint of its pre-capitalist heritage but rather as simply another branch of industrial activity operating within the same capitalist framework the rest of society operates within (cf. Munton, Marsden, Little and Whatmore 1986; Buttel and Goodman 1989; Lawrence 1987; Le Heron 1988a; Friedland 1984). This literature increasingly acknowledged that every nation's agricultural industry is influenced by both local/national and global/international pressures, as well as pressures both internal to the agri-food sector and external to it. Furthermore, as the processes of globalisation have intensified, this industrialized agriculture has penetrated industrializing nations both through foreign aid and development programs such as those that came to be known as the Green Revolution of the 1960s and, more recently, through trade liberalization.

This opening chapter serves as a preamble to the case studies that will follow in chapters four, five and six. It should be noted at the outset that this summary is admittedly structuralist in its nature, focusing on the macro-level in an effort to provide a historical account of the changing understanding of agriculture and to identify the principle actors/actants engaged in the area of agri-food.

3.1 The industrialization of agriculture

Goodman, Sorj and Wilkinson (1987) in their work, *From Farming to Biotechnology*, provide a historical account of the series of technological revolutions which have transformed farming in the industrialized world, and which continue to transform agriculture globally. They, along with many others (cf. Friedmann 1980,

1987, 1991a; Goodman and Redclift 1989, 1990, 1991; Goodman 1991; Lowe, Marsden and Whatmore 1990; Marsden and Little 1990; Marsden 1996) argue that, since the Second World War, the structure of agriculture and the nature of farming both began to change fundamentally in response to a techno-scientific revolution that continues today. This is not to imply that agriculture has only recently become receptive to new technologies and knowledge; agriculture has always adopted new innovations and ideas beginning with the adoption of the plough thousands of years ago and the acceptance of new crops from other parts of the world. What makes this post-World War Two techno-scientific revolution different is both the scope and the complexity of this modern revolution which has transformed farming from an art to a scientific-economic formulation.

This modern revolution has led to a fundamental change in the relations between farmers and off-farm interests resulting in an increasing dependency on off-farm interests on the part of modern farmers. Political economists see this agricultural modernization as resulting from successive appropriations of various aspects of farming by off-farm sectors and the associated creation of industrial products which are then re-incorporated into the agri-food production system. The outcome of this series of appropriations has been the creation of autonomous industrial branches supplying farmers with increasingly sophisticated agro-chemicals (fertilizers, pesticides and herbicides), more efficient and specialized agricultural machinery, superior feeds and seeds, and most recently, biotechnology products, that collectively represent agricultural inputs industries. Similar changes have also occurred in post-harvest activities in such

areas as cold storage and warehousing. The rate and extent to which these new industrial branches have successfully penetrated agriculture and food production have been largely determined by the science and technology of the period. As this science and technology have become increasingly sophisticated over time, successive rounds of innovation have taken place leading to an increasing penetration of industrial inputs both on-farm and in food processing.

This increasing reliance on off-farm inputs has created a new economic reality for farmers. First, quite simply, these inputs cost money. Whereas many of the ‘natural’ on-farm inputs these replaced were generally interpreted as “free” if one discounts the labour and land base needed to be dedicated to sustain these inputs – the manure used as fertilizer on the fields, the seeds stored from one season to the next, and the land dedicated for growing the feed for the farm livestock which served as the machines that powered the farm – the new, industrial inputs have to be bought, thereby drawing farmers into the formal, cash marketplace. Second, this incorporation into the formal cash marketplace encouraged a shift from mixed farming techniques to Fordist monocultural production and on-farm specialization strategies. These trends have been reinforced through the successive rounds of innovation which have crafted ever-more sophisticated and specialized machinery, feeds, fertilizers and seeds, as well as a market network and organization that has also become increasingly specialized and product-specific. Modern farmers have become caught on what Goodman and Redclift (1991) describe as a “technological treadmill.”

These trends have led to the fundamental redefinition of a farmer from a rural constituent to an economic agent or, a *producer*. So understood, a farmer became a businessperson, a consumer of inputs increasingly seen as being essential to maintaining the levels of efficiency and productivity needed for the producer's economic survival, and a producer of marketable goods operating within the capitalist framework of the marketplace. Second, the industrialization of agriculture in industrialized countries has led to fundamental changes in the spatial structure of agriculture and of rural society characterized, in general terms, by dramatic reductions in rural populations and dramatically larger, heavily mechanized farm units. The demographic changes resulting from the de-population of the countryside and the consolidation of farms into larger units have led to the loss of political power of rural populations generally and farmers specifically to other interests in society, particularly urban and consumer interests.

The integration of farms and agricultural production into specialized sets of relationships which extended beyond the farm gate is reflected in what has been termed agro-commodity production chains (Le Heron 1988a, 1988b; Le Heron, Roche and Anderson 1989), agro-commodity systems (Friedland, Barton and Thomas 1981; Friedland 1984; Pudup and Watts 1987), food production chains (Marsden 1990a, 1990b), agri-food complexes (Friedmann 1991), and systems of provision (Fine 1994; Fine and Leopold 1994; Fine and Wright 1996). Each of these reflects a systems understanding and mode of analysis. To Le Heron, such an approach is crucial to understanding the dynamics of industrialized agriculture and food production:

“Important progress has been made by focusing on the specificity of chains of agro-commodity production, which shows how farming in the industrialized nations has overwhelmingly become part of vertically-organized, industrialized processes, comprising the production, processing, storage, distribution, marketing and retailing of food and fibre products” (Le Heron 1994:36).

Le Heron goes further, in synthesizing the work of Dunn (1991), Friedmann and McMichael (1989), Goodman and Redclift (1989, 1991), and Goodman, Sorj and Wilkinson (1987), into a structuralist framework of how agriculture has been transformed in industrialized nations. This is reproduced in Figure 3.1. His analysis links regimes of accumulation with the degree of industrialization of agriculture and its defining techno-economic features, that together, define a specific food regime. In his analysis, one food regime is replaced by another through transitional periods which are characterized by restructuring crises. In Figure 3.2, Le Heron describes each food regime’s principal tendencies, governing premises, main historical features, main international policy features and main national policy features. In the course of his analysis, Le Heron does warn us not to see this simple chronology as reproducible in all capitalist economies, acknowledging that the trajectories of capital penetration vary in differing national contexts. He further warns us against viewing his analysis as an unlinear model of industrial/capital penetration of agriculture (cf. Altson 1991; Friedland, Busch, Buttel and Rudy 1991; Le Heron 1989a, 1989b; Lowe, Marsden and Whatmore 1990; Marsden, Lowe and Whatmore 1990; Marsden and Little 1990). Finally, it is also important to recognize that, in keeping with systems analysis, there exist multiple feedbacks loops embodied within these chains or complexes whereby differing agents (be they producers, processors, distributors/retailers, consumers) by

their actions impact upon the others and can stimulate changes within these complexes.

Nevertheless, the chronology does provide us with a summary of the dynamics

associated with the series of transformations agriculture has undergone, particularly

since the end of the Second World War.

Regimes of Accumulation	Industrialization of Agriculture	Defining Techno-economic Features	Food Regime
Extensive (trade-centred investment)	Application of available technologies in new frontiers. Increased labour productivity from mechanisation. Early industrial substitutes for natural products.	Intersectoral and international specialization, based on products (mainly meat and wheat) and regions of settler economies linked to regions and goods of leading industrial countries.	First Accent on volume production of farm products. Oriented to growing mass markets of wage-labourers in metropolitan and industrial heartlands.
Restructuring Crisis	Increased labour and land productivity from mechanical and genetic-chemical technologies (based on plant hybridisation and intensive energy and other industrial inputs).		Transition Tension between production of farm products and processing of food products.
Intensive (production and trade-centred investment)	Perfection, generalisation and proliferation of high productivity US agro-industrial model.	Intra-sectoral and international integration of grain-feed-livestock complexes (eg., soy beans for protein feed) and wheat complexes (eg., coarse grains for carbohydrate) of 'selected' regions of different nations producing specialized products.	Second Emphasis on volume processing of food products and productivity on-and-off the farm. Oriented to remaking of consumption relations via changing diets and greater participation of women in the labour force.
Restructuring Crisis	Change in natural production features from biotechnology, biochemical and molecular genetics.		Transition Tension between processed and fresh foods.
Integrated (multiple axes of investment centred on production, trade and finance)	Differentiation in production, trade and finance.	Articulation of global systems based on agro-industrial and biotechnological production of foods.	Third Emerging focus on 'fresh and formulated' foods, catering especially for differentiated high income and ethnic consumers.

Sources: Developed from Dunn (1991); Friedmann and McMichael (1989); Goodman and Redclift (1989, 1991); and Goodman, Sorj and Wilkinson (1987).

Figure 3.1. Schema of Agricultural Industrialization (Le Heron 1994:38)

Food Regime	First (pre World War II)	Second (1950s-70s)	Transition to Third (1980s-90s)
Principle tendencies	Culmination of colonialism. Rise of nation-state system.	Extension of state system to former colonies. Transnational restructuring of agricultural sectors by agro-food capital.	Contradictions between productive forces and consumption trends. Disintegration of national agro-food capitals.
Governing premises	Acceptability of alien rule. Propriety of accumulation domain. Importance of balancing power. Legitimacy of neo-mercantilism. Non-interference in other colonial administrations.	Respect for free international markets and free enterprise. National absorption of adjustment imposed by international markets. Qualified acceptance of extra market channels of food distribution. Avoidance of starvation. Free flow of scientific and crop information. Low priority for national self reliance. National sovereignty. Low concern about chronic hunger.	Multi-polarity of power (eg., US, EC, Japan). Global transmission of adjustments. Rise of new protectionism. Retreat from distributional issues. Restricted flow of technological information. Renewed interest in national self reliance.
Main historical features	Centred on European imports of wheat and meat from settler states between 1910 and 1914 and imports by settler states of European manufactured goods, labour and capital.	Based on strong state protection and organization of world food economy under US hegemony after 1945.	Crisis in world agricultural trade, featuring price instability, breakdown in multilateral agreements, increased competition in export markets and limited imposition of structural adjustment policies.
Main inter-national policy features	Imperial preference, with vertical hierarchical relations.	Bretton Woods Agreement, GATT, post-war reconstruction programmes, multilateralism, nondiscrimination and legal approach to regulation. Commodity agreements and conventions. US management of international agricultural trade system via agenda setting in international negotiations.	Attempts to resolve world agricultural trade issues through GATT framework.
Main national policy features	Assistance for land settlement and infrastructure.	Cheap food policies. Credit expansion. Production control mechanisms. Market creation via concessionary export sales and food aid.	Opposing trends of further protection and deregulation of agricultural sector.

Sources: Developed from Armstrong and McGee (1986); Friedmann and McMichael (1989); Puchala and Hopkins (1983); and Young (1989).

Figure 3.2. Schema of Food Regimes (Le Heron 1994:73)

Regimes of accumulation are seen as periods of social and economic stability, separated by restructuring crises. Paralleling this analysis is that of food regimes,

separated by transitional periods which coincide with the restructuring crises. Thus, as agriculture has moved from an *extensive regime* of capital accumulation through a restructuring crisis, brought on by on-farm mechanisation and adoption of agro-chemicals, to an *intensive regime* and finally through another restructuring crisis to today's *integrated regime*, new food regimes have emerged based on the new set of economic and social relations. Le Heron's food regimes also set a rudimentary time-line to his analysis: the First Food Regime, correlated to his extensive regime of accumulation is dated as pre-World War II; the Second Food Regime, correlated to his intensive regime of accumulation is dated the 1950s to 1970s; and the Third Food Regime, correlated with his integrated regime of accumulation is dated the 1980s and 1990s (and presumably is representative of the current state of agriculture transformation).

Admittedly, Le Heron's time-line is somewhat loose as he does not attempt to situate his transitional periods into this summary although this is, again, in keeping with his earlier acknowledgment that there exists a great deal of variability in the trajectory of capital penetration when considered on a nation-by-nation basis. Nevertheless, his historical analysis is instructive insofar as it emphasizes the importance of situating an analysis historically. This analysis becomes, in effect, a historical account of the ascendancy of Euro-American agriculture globally.

These dynamics, as inspired by neo-classic economics, have been extended into the Third World through development and aid programs and through the liberalization of world trade. During the late 1960s and throughout the 1970s, agricultural development

programs came to embrace the idea of agro-technological packages organized around new, improved hybrid plant varieties that became the foundation for the Green Revolution. However, the adoption of these crops brought much more than simply superior yields; these seeds brought with them the industrialized agriculture that characterized the First World. As Goodman observed,

“With the seed as the bearer of technical progress, industrial capitals were forced to adopt strategies of technological convergence, leading to increasingly integrated ‘packages’ embracing high-yielding, fertilizer-responsive hybrids, plant protection chemicals, mechanization, and other advanced management practices.” (Goodman 1991:40)

Scholars of the Third World came to critique this transplanting of Western industrialized agriculture. Lakshman Yapa (1996), for example, came to see these improved seeds as a fulcrum for ecological, political, cultural, social, technical and academic relations capable of creating the ultimate paradox of food production, being the linking of high yields with continuing scarcity, raising the question of who benefitted from agricultural development as it was understood during the 1960s and 1970s.

3.2 The globalisation of food

It is not possible to analyze the post-1945 global agri-food regime without considering it in the context of an advancing globalisation as manifested through increasingly complex sets of corporate relations and the liberalization of trade relations. Trade in agri-food products has existed for millennia, from the local to the global scale, and those who have controlled this trade have often accrued great power and great wealth. Both historians and geographers alike acknowledge, as an example, the significance of the spice trade to European history. The quest for spice drove European

expansion and helped to propel Europe's 'Age of Discovery.' However, the global trade in spices pre-dated both the Portuguese adventure around the Cape of Good Hope and the Spanish western quest for Cathay by thousands of years. Records dating as far back as 2600BC recount how the Egyptians fed spices obtained from Asia to the slaves building the Great Pyramid of Cheops to give them strength. Archeological evidence from the Middle East points to the popularity of cloves in Syria. Similar textual and archeological evidence recounts a vibrant Chinese spice trade with the spice islands that are now part of Indonesia (Rosengarten 1973; Hobhouse 1992; Corn 1998).

How this global trade in agri-foods was organized, however, changed dramatically with the physical entry of Europe into non-European regions. Once organized principally around socio-economic relations, trade became organized around a political-economic framework as European nations extended their political control over non-European territories and peoples. This colonial trade coalesced into the mercantile framework within which colonial possessions provided goods to the metropolitan or imperial centre. Iain Wallace notes there were two forms of colonization associated with this European expansion: "colonies of settlement," concentrated in more temperate regions in which European society was, in effect, transplanted through settlement programmes; and "colonies of exploitation," situated principally in tropical territories and organized around the production of a particular mineral or agricultural staple "on the basis of repressive social order imposed by Europeans on an existing population, or on an imported one (of slaves or indentured labourers) where native people were few in numbers" (Wallace 1995:47). These colonies of exploitation "formed enclaves, islands

of capitalist production and its associated technological and economic infrastructure in a region whose indigenous economic development was, at best, severely disrupted (at worst, destroyed)” (Wallace 1995:47). The relative importance of these two types of colonies is aptly illustrated by a Canadian example and the selection of the sugar island of Guadeloupe along with Martinique, Belle Isle and St. Lucia by the French monarchy over Quebec at the Peace of Paris in 1763 following the Seven Years’ War. Evidently, the needs of the imperial metropolitan centres for tropical products was of greater importance to the French monarchy than the return of its transplanted citizens in Quebec. McMichael and Raynolds summarize this relationship between colonies and metropolitan centres:

“The central historical fact of the colonial era was the violent incorporation of colonial lands and peoples into an expanding world capitalist economy driven by the process of commodification. The global division of labour that emerged was the result of separate, and rival, colonial systems established by the metropolitan powers to service their growing needs for tropical products, and to enrich their merchants who organized the associated trade in slave labour and manufactured goods to facilitate colonization. Colonial administrations were extensions of metropolitan bureaucracies, organized to extract profits and materials through exclusive trading monopolies geared to metropolitan requirements. Vast plantations, estates and small-farming schemes developed around the production of tropical export crops ranging from rubber to bananas to groundnuts, depending on local agro-ecologies. The cumulative effect of colonialism was to generate a pattern of world-economic specialization whereby agriculture, and agricultural exports, became the defining speciality of the region that became known as the ‘Third World’.” (McMichael and Raynolds 1995:318)

The outcome of this agricultural specialization and incorporation into a capitalist-driven global market organization transformed the landscape and social structures of these territories and made them dependent upon Europe. While this process began during the colonial period, it has continued since the Second World War with the incorporation of the newly independent former colonies into the global capitalist regime. As McMichael

and Raynolds conclude, “The fate of the Third World economy thus came to be dependent on this imposed specialization and the complementary relation with the First World via agricultural exports. This condition continues today, although the content of the complementarity has changed” (McMichael and Raynolds 1995:318).

This change that McMichael and Raynolds refer to was reflected in the nature of the products traded. Trade originally focused on luxury goods such as spices and silks (Rosengarten 1973). However, during the nineteenth century, agro-exports from colonial possessions shifted from a focus on luxury items to a broader selection of tropical commodities being demanded by both an increasingly affluent population, and included sugar, coffee, tea, cocoa and vegetable oils, and new industrial consumers, including cotton, timber, rubber and jute.

This deepening “complementarity” (or “dependency”) has continued to take on added dimensions. Although the substitution of tropical products, as noted in the previous section, has led to agricultural instability in many Third World nations, new complementarities/dependencies have emerged. One prominent development since the Second World War has been the creation of a global fresh fruit and vegetable industry, structured around the ‘post-modern’ dietary demands, the development of counter-seasonal production, and distribution capabilities of advanced economies (Friedmann 1991a, b). However, it must again be noted that this fresh product complex has had a significant adverse impact on food production in many non-industrial nations, displacing traditional and local products in favour of export goods, and disrupting rural structures and stability (cf. Indonesian apple industry, Schroeder and Suryanata 1996; Bermudian agri-food production, Marsden 1997).

A second form of globalisation has been the formation of a durable goods or high value foods (HVF) complex, made possible by technological advances in food processing, that have resulted in the adoption of 'Post-Fordist' food production strategies and the targeting of niche markets (Friedland 1994; Jaffee 1994; Raynolds *et al* 1993; Cook 1994; Fine and Leopold 1994; Goodman and Watts 1994; Goodman and Watts 1997). Spices, for example, are no longer only available in their raw form to the modern consumer, but also already blended or even processed into pastes that serve to minimize food preparation time.

Le Heron's Third Food Regime is characterized by the often-conflicting goals of national governments to promote greater agricultural trade liberalization on the one hand while retaining the power to design national agri-rural policies in keeping with national objectives on the other. One reason for this conflict was the increase in productivity being realized because of the techno-scientific revolution taking place on farms in Europe, North America and Australia/New Zealand. This increase in production, first within the global wheat complex and subsequently within the soybean-livestock complex in the post-World War Two period, is the principal cause of present instabilities in the global agri-food regime. During the 1970s, this tension led to dramatic surpluses and costly trade wars. The United States adopted an export-expansion strategy under which farm policy shifted from domestic supply management, through the use of food aid and set-aside programs, to global demand management and the use of export incentives. This shift in policy coincided with dramatic increases in exports of wheat and grains to developing countries, principally China, and to the Soviet

Union. However, during the same period of time, aggressive agricultural programs adopted under the Common Agriculture Policy transformed the European Union from being the world's largest net importer of food and agriculture products to the second leading exporter. European surpluses and export subsidy programs only served to intensify global competition and crisis. Despite the national social objectives embodied in the actions of both the United States and the European Union, the resulting history of over-production, surpluses, export subsidies, product dumping on international markets and trade wars, fuelled a desire to stabilize the global agri-food regime. The capacity to over-produce, made possible by continuing advances in technology and biotechnology and endorsed politically, was quite simply threatening producers globally and taxing national treasuries into burdensome budgetary deficits.

In 1982, two independent investigative committees were formed, one by the United States' Committee on Trade and Agriculture and the second by the OECD, to study options leading to greater agri-food trade liberalization. The reports of these two committees formed the technical basis for subsequent international negotiations under the framework of the General Agreement on Tariffs and Trade, or GATT. These negotiations were, however, threatened only three years later with an intensification of subsidy wars between the United States and the European Union. A third player emerged at this time, a collection of small and medium-sized agricultural exporters (including Canada) which formed the Cairns Group of Fair Trading Nations in 1986 to promote the reformation of international agri-food trade.

The efforts initiated in 1982 were not the first attempts at agricultural trade liberalization. Such negotiations within the GATT framework had begun in the early 1960s with the Kennedy Round (1964-1967). Prior to this round, agricultural issues had been excluded from GATT as a result of the U.S. Congress' insistence that agriculture be exempt from a general prohibition on export subsidies and import restrictions (Le Heron 1994). Little progress on trade reform was achieved during both the Kennedy Round (1964-1967) and the Tokyo Round (1973-1979) of GATT. A renewed effort was launched during the Uruguay Round (1986-1992), spearheaded by the Cairns Group in concert with a collection of developing countries which had become more active as exporters of agri-food products and who considered themselves to be increasingly marginalised by the continuing policy disputes between the United States, Europe and by that time, Japan (Corbet 1985).

There was no question that, by 1986, the state of the global agri-food regime had become a political priority in many nations with concern focusing on the global structural surpluses resulting principally from domestic policies of subsidy and protection (Miner and Hathaway 1988). In the Ministerial *Declaration at Punta del Este* that launched the Uruguay Round, two points were emphasized: first, that there "is an urgent need to bring more discipline and predictability to world agricultural trade by correcting and preventing restrictions and distortions including those related to structural surpluses so as to reduce the uncertainty, imbalances and instability in world agricultural markets;" and second, that "negotiations should aim to achieve greater liberalization of trade in agriculture and bring all measures affecting import access and

export competition under strengthened and more operationally effective GATT rules and disciplines.” This rule revision would include both improving market access and improving the competitive environment by the reduction and eventual elimination of all direct and indirect subsidies. So stated, this included minimizing the application of sanitary/phytosanitary regulations and technical regulations that acted as barriers to trade.

Following the collapse of these negotiations in December 1990, and a two-year hiatus, efforts were once again renewed. At that time, according to the Institute of International Economics and Research on Public Policy (ITE/IRPP), the one crucial question to be asked was:

“will the main countries concerned, having resisted the application of international rules to agricultural trade, accept multilateral obligations that would constrain their domestic agricultural policies and open their markets to greater international competition?” (Le Heron 1994:184)

Simply put, could nations put aside national priorities and interests in the interest of greater global stability?

This apparently was the case. In November, 1992, the US and the EU settled most of their outstanding differences concerning agriculture in an agreement informally known as the “Blair House Accord.” In July of the following year, the US, EU, Japan and Canada announced significant progress in negotiations concerning tariffs and issues related to market access, although it took until mid-December of 1993 to reach full agreement (WTO 2002c). The framework that these countries initiated formed what became the Marrakesh Agreement in April 1994. Under this Agreement, all members of the World Trade Organization (the WTO) are now committed to substantial tariff

reduction on many agricultural commodities to promote freer trade. These reductions are summarized in Figure 3.3.

	Developed countries 6 years: 1995-2000	Developing countries 10 years: 1995-2004
Tariffs:		
• average cut for all agricultural products	- 36%	- 24%
• minimum cut per product	- 15%	- 10%
Domestic support:		
• total AMS cuts for sector (base period: 1986-88)	- 20%	- 13%
Exports:		
• value of subsidies	- 36%	- 24%
• subsidized quantities (Base period: 1986-90)	- 21%	- 14%

Figure 3.3 Reductions in subsidies and protection under the Marrakesh Agreement (WTO 2002a).

In general, the new rules and commitments enacted under the Marrakesh Agreement apply to: *market access*, including various trade restrictions affecting imports; *domestic support*, including subsidies and income support programmes; and *export subsidies* and other programs designed to make a nation's exports artificially competitive (WTO 2002a).

It is the objective of this agreement to make agri-food trade and Member Nation policies more market-oriented. While the Agreement does allow governments to provide support to their rural economies, a government cannot introduce any support that could distort international trade. As noted in Figure 3.3, some flexibility has also been introduced specifically for the benefit of developing nations which are permitted to retain higher levels of support and have longer to fulfil their obligations under the Agreement.

In addition to these tariff reduction commitments, agreement on two lesser-known associated Agreements was reached: the *WTO Agreement on the Application of Sanitary and Phytosanitary Measures* (commonly known as the SPS Agreement) and the *WTO Agreement on Technical Barriers to Trade* (the TBT Agreement). The SPS Agreement covers agri-food safety issues as these affect humans, animals and plant life while the TBT Agreement, which was first drafted during the Tokyo Round, covers all technical requirements and standards, such as the labeling and packaging of products. The SPS Agreement specifically acknowledges that the responsibility for the development of such standards for foods lies with the *Codex alimentarius* Commission. It further stipulates that the development of international standards regarding animal and plant health are the responsibility of the International Office of Epizootics (OIE) and the International Plant Protection Convention (IPPC) respectively. While Member nations are encouraged to use international standards, guidelines and recommendations if these exist, a nation can introduce measures incorporating higher standards but only if these can be scientifically justified as essential to protecting that nation's animal, plant or human populations. In addition, while nations may use different methods of inspection, if an exporting nation can demonstrate that its inspection programs are comparable to those of the importing nation, then the importing nation must accept the exporting nation's system as equal and thus accept that nation's agri-food products into its domestic marketplace.

As this international regulatory framework has evolved, the global agri-food regime has also undergone profound structural changes at the corporate level. Wallace writes of the strained relations between states and transnational corporations (TNCs):

“The modern TNC possesses, to a historically unprecedented degree, the structural freedom of action which accrues to economic enterprises in a capitalist world-economy characterized by fragmented political jurisdictions. Advances in transportation and communications technology, and in the power and scope of information-processing systems, have provided the material preconditions for a relatively small number of firms to attain dominant positions, first on a national and then on an international scale. ... It [is] apparent that the indisputable economic power of leading TNCs is further consolidated by the pervasive and often intangible influence which they derive from it. On the other hand, there is evidence that individual states are far from completely powerless to channel the activities of TNCs along lines which increase the benefits accruing to their domestic economies. In general, core states have more leverage to influence corporate behaviour than do peripheral ones, but even under certain conditions even peripheral nations can bring substantial pressure to bear on TNCs operating within their territorial limits.” (Wallace 1995:134)

Wallace’s last observation is particularly foreboding from a Third World perspective. A corporation assesses such issues as access to and control of resources, access to markets, access to a labour pool, and flexibility of capital movements when considering locational questions. In an increasingly “free” world, a nation’s ability to influence a TNC is dramatically reduced.

As noted in the introduction to this second part of the study, globalised corporate networks are coalescing and studies indicate that an increasing percentage of world trade is now internalized in transnational corporations (Watts and Goodman 1997) (cf. Clairmonte 1981; Connor 1989; Furzer 1989; Handy and MacDonald 1989; Mintz 1986; UN Centre on Transnational Corporation 1988). These networks, or complexes, or chains, however, are not to be understood in the same sense as those forming for automobiles, seen as producer driven, or for textiles, which are retail driven. As Watts and Goodman observe,

“If globalisation is to refer to the spatial configuration of markets, deterritorialised corporations, new forms of corporate and inter-firm organization exemplified by strategic alliances and networks – the paradigmatic cases being electronics and automobiles – then the agro-food sector is clearly not global in any simple sense.” (Watts and Goodman 1997:14)

Thus, the global agri-food regime is not necessarily characterized by vertically integrated transnational organizations (TNCs). Watts and Goodman describe a general topology of corporate structure within the global agri-food regime that

“reveals the varied forms of corporate international production subsumed under the composite label of globalisation: ‘multi-domestic affiliates, simple integration through outsourcing, and complex, vertically and horizontally integrated systems, exemplified by leading TNCs in electronics and automobiles” (Watts and Goodman 1997:15).

Some TNCs, such as Conagra and Cargill, employ “multi-domestic” strategies instead of single sourcing. Such agri-food TNCs have more in common with their predecessors, the mercantilist trading companies, than TNCs of other economic sectors (Gouveia 1994). At the same time, however, other agri-food TNCs, such as Kentucky Fried Chicken, McDonald’s, Dole Food Corporation and Chiquita Brands International, have tended to be more vertically-organized in keeping with a traditional understanding of TNCs (Boyd and Watts 1997). To muddy the waters further, Watts and Goodman also point out that “a select group of giant food TNCs – Coca Cola, McDonald’s, Kellogg, Nestlé, Unilever – with global brand names has evolved global marketing strategies, albeit with adaptation to local tastes, but production is locally based” (Watts and Goodman 1997:15). The question posed by TNCs, therefore, is more complex because of the heterogeneous nature of these corporate structures.

Sanderson (1986) goes further in suggesting that it is necessary to look beyond TNCs in considering the changes in the global agri-food regime and consider instead how national production, processing and retailing systems are not being organized within TNCs but rather are increasingly being subordinated to the *logic* of global production as organized by TNCs. One example of this is the imposing of retail

specifications by one nation or group of consuming nations onto producing nations.

Marsden (1997) considers the influence of British/European retail food chains on fruit production and processing in the São Francisco Valley, Brazil. This particular case considers questions of security of delivery and quality, both of which were effectively established by the retail chains. A second aspect of this extension of retail influence is illustrated again by Marsden in his study of Barbadian efforts to restructure their agricultural industry in response to the loss of preferential access of its sugar and bananas to European markets and the uncertainty related to the outcome of the Uruguay Round of GATT negotiations. In an effort to diversify its agricultural base, Barbadian officials focused on producing for niche external retail markets (Marsden 1997). These considerations suggest two important points. First, as Sanderson suggests, it is necessary to consider not simply the nature of TNC organisation, but also the changing organisation of national agri-food sectors in general; and second, as Friedland (1991) observes, there has evolved another form of globalisation beyond TNCs and their affiliates, characterised by integrated networks of independent actors that link major consumption areas with old and new production areas.

3.3 Who or what, then, make up the global agri-food complex?

Once again we are confronted by a heterogeneous world operating at the local, regional and global scale. Who/what, then are the principle actors in this agri-food complex? Based upon the discussions of this chapter, it is possible to present a tentative cast list of actors in the global agri-food complex. First, there are *people*, including farmers/producers, manufacturers of agricultural inputs, shippers, storage/warehouse

managers, food processors, exporters, importers, distributors, retailers, foodservice personnel, government officials, veterinarians, researchers and marketers. Second, there are *corporations* of various sizes and organizational structures, from local to global in the form of TNCs. Third, there are industry *organizations* – including producer organizations ranging from sectoral organizations to supply management associations, and other sectoral organizations including those for agricultural inputs, shipping/transportation, storages/warehouses, processing, export/import, distribution/wholesale/retail, foodservice and consumer. Furthermore, these exist at the sub-national, the national and the international scales. Fourth, there are *governments*, including national, sub-national (provincial or state), and international governments and institutions. These can be further broken down into their various departments (departments of agriculture, health, the environment, and industry) and even further into their specific branches and their respective activities (research, marketing, inspection, etc.). Fifth, there are trans-national, quasi-political institutions, including regional trading blocks and organizations such as the WTO. Sixth, there are the *policies, programs and agreements* initiated at the sub-national, national and international levels associated with the global agri-food complex. Seventh, there are the *technologies* associated with the various aspects of agri-food production, processing and marketing, as well as *knowledge* related to aspects of research and development. Eighth, and finally, there are the myriad of *food products* themselves.

Chapter 4. Regulation, Agri-Structuralism and the Globalisation Perspective

In this chapter, the globalisation of the agri-food regime will be examined from the viewpoint of Regulation Theory, and more specifically, Le Heron's globalisation perspective. Following a brief explanation of Regulation Theory, Le Heron's analysis will be explored, highlighting which actors he understands as being significant and in what context. A commentary will close the chapter, considering what insights this form of analysis offers and what is excluded due to its theoretical framework.

4.1 Regulation Theory

While the intellectual roots of Regulation Theory lie in political economy theory and Marxian structural analysis, the origins of the Regulation School itself can be traced to Antonio Gramsci (Peet 1998). Gramsci came to oppose the Marxism of his day which he saw as positivistic, scientific and mechanistic. He viewed it as being overtly deterministic in nature and of little practical use in explaining "the diverse interplay of forces operating during 'conjunctural periods' of social transformation" (Peet 1998:129), or periods of social upheaval and change. In its place he sought a new understanding of the human condition which incorporated a more dynamic relationship between the economic sub-structure of a society and its political and ideological superstructure, or as Peet describes it, a social order that is "reciprocal, complex and changing [and in which] politics, ideas, culture could have overriding powers" (Peet

1998:129). Gramsci, therefore, sought to incorporate non-economic considerations into his Marxism as essential elements in the creation and maintenance of specific forms of social organization.

Gramsci termed his theory “ideological hegemony” although his idea of hegemony differs from domination. Whereas hegemony understood as domination consists of direct physical coercion in a political society, his ideological hegemony is more benign, consisting of ideological control within a civil society. Thus, “ideological hegemony” exists within the rules and organization of the society. As Peet explains, this

“hegemony implied the permeation through agencies like unions, schools, churches, and families of an entire system of values, beliefs, and morality supportive of the established order and its dominating classes: hegemony is a world view diffused through agencies of socialization into every area of daily belief which, when internalized, becomes part of ‘common sense’.” (Peet 1998:129)

To understand the nature of a society and its organization, and its perpetuation, one needs to examine the rules and regulations, both formal and informal, enacted by that society. This idea evolved into Regulation Theory which Peet describes as “highly influential, if not hegemonic, at least on the left, as a line of thought employing structuralist yet intermediate level and quasi-empirical concepts to theorize periods of capitalist development and associated territorial structures” (Peet 1998:132).

The essential idea of Regulation Theory is that a society seeks stability through regulation. Regulation theorists (Aglietta 1979; Lipietz 1987) reject the notion that market equilibrium is the sole organising force in capitalism. Instead, they argue that it is the nature of societal reproduction of activities that is central to achieving social stability. They therefore consider how social and institutional “ensembles” seek to

achieve economic stability by maintaining a particular regime of accumulation (Page 1997). Michel Aglietta argues that stability within a society is achieved through the “codification of social relations” or “modes of regulation” that serve to mediate, to normalize and ultimately to regulate social relations. He saw society increasingly organized around “structural forms” consisting of “complex social relations, organized in institutions, that are the historical products of the class struggle” (Aglietta 1979:19-20). These structural forms include not only formal state institutions but also non-state forms, social practices, habits and norms operating within a society. To Le Heron these modes point “to the process of harmonizing production and social demand through a set of structures and institutions” (Le Heron 1994:65). Peet, in his discussion of Gramsci and Regulation Theory, similarly writes that the “determinate relationships reproduced in these particular structures assure integrity and cohesion to the entire socio-economic-political system” (Peet 1998:131). The nature of these structures prompts Regulationists to raise basic questions concerning the relationship between what Le Heron describes as a society’s “techno-economic processes” and the society’s “institutional setting”:

“What is the relationship between techno-economic processes and regulatory modes? What is the relationship between modes and related outcomes and behaviour? What do economic agents perceive and respond to when they act in context of power relations, interests and values set by other economic and institutional actors?” (Le Heron 1994:65)

Regulatory theory, therefore, states that the course of capital accumulation is based upon more than techno-economic ingredients, considering “such processes ... as inducing responses, adjustments, social struggles, and political choices, with conflict resolution depending on the nature of institutions and social practices” (Le Heron 1994:65).

At the same time, however, it is important to note that these structures are not fixed in time. Regulationists acknowledge that, while the societal framework of capitalism can be stable over long periods of time, there do occur periods of change through which a new stability emerges. Simply put, they can, and do, break down. Krondatieff long waves serve as one such example. In considering Krondatieff waves, Perez writes that

“the movement of capitalism, out of crisis into a growth phase, rests on the appearance of new techno-economic paradigms which, to yield their full growth potential ‘requires a fundamental restructuring of the socio-institutional framework, on the national and international levels. The resulting social and institutional transformations then determine the general shape of economic development, or the ‘mode of growth’ of the next long wave.” (Perez 1985:44)

Peet suggests that the historical trajectory of Euro-American “society from manufacture to machinomanufacture to scientific manufacture, Fordism and beyond” (Peet 1998:134) serves as a second example.

Instability occurs, Peet writes, as a result of weak spots. These

“appear in these relationships where corrective, regulative mechanisms may break down, threatening the system, which reacts as a totality by modifying its regulatory forms; a changing regime takes place in a morphological transformation that may be considerable in scope, with such ruptures marked by crises of intense social creativity.” (Peet 1998:131)

Regulation Theorists, therefore, seek to shift the focus of inquiry away from traditional Marxist themes of production to modes of regulation, which are both historically and geographically specific (Lipietz 1993). In so doing, they acknowledge the inter-related nature of society that binds particular forms of production, consumption, distribution and exchange together.

It should also be acknowledged that Regulation Theory is not to be understood as a homogeneous body of literature. Jessop (1990) points to the plurality of opinions held

by regulation theorists concerning the object of study. These include wage relation, rules of competition, social formation, and relations between national and regional structures within the global order. To Le Heron, however, this can be seen as a strength,

“The contribution of the different schools of regulation thought is less any unified agreement on the detail of regulatory structures but rather that the schools offer assessments of different sites, objects and mechanisms of regulation and in doing so, provide a sufficiently broad framework to accommodate processes operating at all spatial scales.” (Le Heron 1994:65)

He thus points to the multiplicity of regulatory studies as a way of fully reflecting social diversity.

The process of regulatory development as it pertains to globalisation takes on added dimensions. In considering the dynamics of globalisation and its impact on regulation, Jessop suggests that regulation theorists must consider the relationship between smaller and larger sites:

“How are smaller sites of regulation related to larger sites and how are their relations mediated through structural forms and modes of regulation? Is there a mode of macro-regulation which accords different smaller sites their place in some overall regulation strategy or does macro-regulation simply emerge from the interaction of lower level practices and/or partial modes of regulation?” (Jessop 1990:191)

The emergence of a global regulatory framework following the Marrakesh Agreement would indicate such a nested relationship. While the macro-regulatory framework of the WTO/Codex was initially the product of negotiations between nation-states, it has come to take on a life of its own as a site of regulatory generation. Le Heron agrees that the outcome of this regime is the nesting of smaller sites of regulation into large frameworks:

“A ‘global’ regulatory strategy involves subordinating and organizing a number of smaller sites of regulation (social forms, structural forms) within its orbit. A global strategy is intended to structure the possible field and scope of action of smaller sites, but these smaller sites have an independent existence and can be sites of resistance to the global strategy.” (Le Heron 1994:66)

The idea of subordinating and organising smaller sites does not imply coercion. To Regulationists, it points to the central role assumed by negotiation and consensus between levels of institutions. It also points to the fragility of regulatory formulation and the possibility of more than one regulatory outcome. As Jessop observes, “we must think of a plurality of possible regulatory strategies, even within the framework of one nation-state, whose precise character, social boundaries, cohesive capacities and dynamics will differ according to which global strategy (if any) become dominant” (Jessop 1990:193-194).

What is absent from discussions on Regulation Theory in Le Heron, however, is a more detailed consideration of the process of decision-making and consensus-building. Who has a ‘voice’ in any such negotiation? Strange (1983) makes the important point that negotiation often occurs between those ‘players’ who are understood as being dominant players. These bargaining partners can have different types of power – corporate, political, or a combination of both – and, as a result, “any bargain struck is likely to be a highly variable mix of economic and political beliefs, opportunities and costs and constraints” (Le Heron 1994:67). Nevertheless, this question of who has a voice in negotiations has been raised with regularity concerning not only international negotiations such as the ongoing negotiations on global warming, but also in intra-national discussions within various nation-states, including Canada. Here again, many postmodern thinkers point to the marginalised voices of society, including women, indigenous peoples and minorities. Such dynamics of inclusion and exclusion, however,

also extend to include other actors in the 'mainstream.' Le Heron is quite right to ask, "Does this mean, however, that strategic selectivity is set in regulatory structures and that structural transformation is the product of strategic interactions?" (Le Heron 1994:67) It would appear so, and this should raise concerns in so doing.

Putting aside the rather disturbing question about who has a voice in societal negotiations concerning regulation, there is also the question of how national debates and international negotiations are reconciled. While this is not considered specifically by Le Heron in his study, the idea of negotiation, and particularly international negotiations, can be considered through R.D. Putnam's (1988) two-level bargaining framework. This consists of an international level of negotiation, Level I, and a national level of negotiation, Level II. Conceived of as game theory, this two-level framework has as its objective the successful negotiation of an agreement at Level I and its successful ratification, or approval, by the Level II participants, being the nation-states.

These two levels are seen as highly interactive. William Avery (1996), in his application of Putnam in appraising US negotiating strategies in the North American Free Trade Agreement (NAFTA), examines this inter-activeness and its significance:

"Level II interests usually mold the bargaining positions and strategies at Level I. Expectations about prospects for ratification also determine the parameters within which potential agreements are considered. Similarly, Level I developments can affect politics at Level II, sometimes increasing the prospects for ratification and at other times diminishing them." (Avery 1996:116)

This, however, is not an easy task. Avery continues,

"In two-level bargaining, failure to gain acceptance of the agreement at Level II can doom it altogether. This is because the agreement cannot be amended at Level II without reopening negotiations at Level I. Negotiators must be aware of the constraints imposed on them in Level I deliberations by Level II constituencies. But Level II constraints can also work to the advantage of Level I negotiators. When these constraints are perceived to be especially restrictive, one's negotiating counterparts may extend an additional degree of bargaining latitude." (Avery 1996:116)

The objective of the interaction between the two levels is to create “win sets” consisting of all sets of possible Level I agreements which would win ratification at Level II. The wider, or more encompassing, a win-set is, the greater the chance of its ratification. This approach, as it was applied to the NAFTA negotiations, will be considered in more detail in the next section. What is of importance, at this point, is recognition that both the nature of the participants accepted into the negotiations concerning regulation, being state governments and major domestic actors, and the process by which considerations cross levels of negotiations are both highly contested.

To Raynolds, political economy and Regulation Theory are both theoretically and methodologically compatible. She writes, “at their best, both approaches eschew overly essentialist and deterministic models of development and pursue a dialectical analysis of the complex social forces and institutions shaping concrete economic processes and the multiple, recursive trajectories of change” (Raynolds 1997:120). Others, such as Page, are less convinced, arguing that the application of Regulation Theory has led to “Fordist agriculture approaches” at a time when critiques of Fordist/post-Fordist frameworks were appearing in industrial studies and generated studies in which “the distinctive technological, organizational and institutional character of agriculture was all but obliterated” (Page 1997:135). As a result, Page concluded that the application of Regulation Theory should be more selective. Furthermore, in the Regulation Theory literature there is an acknowledgment that no single regulatory strategy, or framework, can guarantee that a particular accumulation regime can be maintained for ever (cf. Lipietz 1987) and therefore there exists space for alternate regulatory frameworks to emerge.

In summary, central to Regulation Theory is the belief that modes of regulation can, and do, change as economic circumstances change, leading to alternating periods of stability and instability or crisis. Periods of crisis lead to the renegotiation of modes. Stability within a society is sought through a process of negotiation and consensus that leads to the successful reorganizing of production and/or consumption or the creation of new institutions and social practices. These negotiations must also take place in some forum and, consistent with orthodox Western geopolitical thought, regulation theorists emphasize the state government as the key level of governance and the principal actor engaged in negotiations both at the national level (Level II) and the international level (Level I). Regulation Theory, therefore, acknowledges first, that different modes of regulation can exist simultaneously within a society and second, that modes change over time in any national and international framework.

4.2 Regulation Theory, globalisation perspective and the global agri-food regime

Regulationists suggest that the application of Regulation Theory offers analysts not only a theoretical framework for considering the increasingly complex economic relationships within the global agri-food regime, but also the institutional framework in which these relationships exist and are perpetuated. Le Heron suggests that Regulation Theory can be applied at several levels, as outlined in Figure 4.1.

Le Heron emphasizes the nature of institutions in the regulatory process, arguing “that most studies of agricultural transformation severely underestimate or misunderstand the importance of the institutional setting in shaping the direction and character of agricultural development” (Le Heron 1994:62). Conventional analysis, he

Political Economy Perspective ¹	Parallel Concepts in Agricultural Policy Literature ²	Main Dimensions of Interest
accumulation and regulation	long-term economic trends and political developments	structural constraints and opportunities
food regimes	international policy arena	historical trajectories
state form	national policy area	relative autonomy state's role state management paradigms
state function	political bargaining	decision-making models
state apparatus	policy processes	interest groups (outsider political inputs) policy community (insider political inputs) 'Iron triangle' hypothesis

¹ Cloke (1989a, b); Little (1987); Brindley, Rydin and Stoker (1989); Cox, Lowe and Winter (1986); Moran and Cocklin (1989).

² Moyer and Josling (1990); Smith (1990); Wilson (1977); Knutson, Penn and Boehm (1983); McCalla and Josling (1985); Paarberg (1980); Troughton (1991).

Figure 4.1 Schematic Representation of Policy context (Le Heron 1994:64)

suggests, considers the primary focus of debate should be over the decision making process and the nature of negotiations, but in so doing, such analysis “ignores the possibility that the existing institutional framework itself, in which agricultural policy is set, may be called into question” (Le Heron 1994:62). Although he does not elaborate upon this, it is possible to speculate that he is referring to such aspects of institutional organization as its mandate, its established relationships within the state structure, between levels of government and with corporate clients. Furthermore, a focus on the decision/negotiating process can result in other restraints, such as competition for fiscal and human restraints within institutions and particularly state institutions, being overlooked. And finally, it has led in the past to the partitioning of agricultural policy into three domains: a national framework, an international regulatory framework, and examination of institution-local agriculture interaction (Le Heron 1994).

More specifically, Le Heron suggests adopting a variation of Regulation Theory –

what he terms a globalisation perspective – in examining changes in the structure of global agriculture. This perspective

“consists of several interrelated arguments. First, studies must include the global capitalist accumulation process as an integral part of theoretical, empirical and policy analysis. Second, when examining any sphere of economic activity, developments in capitalist forces in that sphere need to be outlined, in order to reveal major determinants and interconnections of production and consumption relating to the sphere. Third, the regulatory arrangements of the sphere must be examined, as these are an important influence on how accumulation proceeds.” (Le Heron 1994:2)

He further argues that, “by adopting a globalisation perspective, the problem focus for developments in ‘agriculture’ and ‘policy’ relating to agriculture can be restated: agriculture is globalised and so must [any] policy which has any aspect of globalised agriculture as its focus” (Le Heron 1994:2).

As part of this analysis, he proposes that the idea of an agro-commodity chain or complex, as discussed in chapter 3, provides the essential structuralist framework for comprehending the complexities of the globalising agri-food sector. He writes:

“An agro-commodity chain rests on a distinctive ecology; involves a series of ‘sites’ of physical production at which natural, industrial and other inputs are variously transformed into potentially useful and exchangeable products; is sustained by equally distinctive social and cultural arrangements; and evolves in the wider context of capitalist political economy. Importantly each site of physical production is also the site for the creation of value, through the application of labour. The abstract notion of the agro-commodity chain thus highlights the interdependence of a range of investors at different stages in physical production; the direction of evolution of parts or the whole chain; competition among interests; sources of conflict, around class, gender and ethnicity; interconnections with multiple political constituencies; and the geographical specificity of chains.” (Le Heron 1994:45-46)

Whether this does, in fact, provide a framework for considering this range of questions and particularly space for considering conflict will be addressed later. At this point of the discussion, what is important is the belief that such a concept allows one to explore how such a chain is established, how it is maintained and even how it shatters and reforms into a new set of relations.

Le Heron summarizes the essential aspects of his globalisation perspective:

“First, a knowledge of key organizations in different industries and across industries is vital, as this gives an entree into the realm of the power relations which mesh the production-organizing entities of the chains. Second, an essential focus is how the ‘structural coherence’ of the agri-systems is created and maintained, through the relative power exercised by different interests seeking to influence change. ... Third, the integrative and fragmentary tendencies manifest in contemporary agro-commodity systems, are at present differentiating segments of the agricultural labour process ‘out of farming’, reducing the difference between agricultural and other labour markets.” (Le Heron 1994:48)

This approach thus concentrates on groupings rather than the firm or individual producer level. These include farmer, commodity, trade, agribusiness, co-operatives and services sectors. Le Heron cites the formation of alliances through the application of the ‘iron triangle’ thesis of group capture (Le Heron 1994:70). Citing a study by Salisbury *et al.* (1987) of the U.S. agricultural lobby and the formation of ‘farm peaks,’ Le Heron observes that there are, in reality, few participants involved in government lobbying and that there exists very little discord between these participants. This analytical approach has also been applied to the rise of policy communities, combining government and various groupings involved in the agri-food complex, that place greater emphasis on power relations. This does not, however, preclude input from individuals or smaller groupings. In their study of rural pressure groups, Cloke and Little (1987) conclude that these groups approach governments in a pluralistic manner, through multiple points of entry and through electoral politics (cf. Flynn 1986).

Shifting our attention to the international arena, post-war economic reform, initiated by the U.S., focused on two aspects: the creation of an international framework for monetary rules and the promotion of trade liberalization. The first objective was

achieved during the 1944 Bretton Woods Conference and the drafting of the charters for the International Monetary Fund (IMF) and the World Bank. The second was organized around GATT (Le Heron 1994). The objective of GATT was the endorsement of trade policies by member states embodying four features – liberalism, transparency, stability and non-discrimination. The scope of GATT is therefore limited. Le Heron cites the work of Finlayson and Zacher (1983) who argue that

“The GATT is at the center of a particular trade regime, which has for the most part been concerned with one international trade issues area, namely trade barriers which are state policies or practices that impeded access countries enjoy to each other’s markets for their exports.” (Finlayson and Zacher 1983:274)

The impact of private business practices have not been effectively incorporated into the GATT’s regulatory or consultative frameworks.

The evolution of a global agri-food trade framework was considered in the previous section. It is, however, interesting to consider how negotiating positions of the principle actors changed over the seven years of negotiation during the Uruguay Round. Le Heron summarized these in Figure 4.2. The outcomes of the Uruguay Round of the GATT were presented in the previous section (see Figure 3.3) and can be compared to see how negotiating stances changed over time and were finally resolved. What is important to consider here is the extension of Regulation Theory into the international arena. Although Le Heron does not consider the interactions between national and international institutions during the GATT negotiations (something that would constitute a doctoral dissertation in itself), Putnam’s two level bargaining framework provides an extension of Le Heron’s globalisation perspective. As outlined in the previous section, the challenge, in this instance, is to achieve agreement at the national

level of agreements reached at the international level. This requires attaining sufficient consensus at the national level to secure passage of the international agreement. Avery (1996) applied Putnam's framework to the dynamics of negotiation and consensus-building in the United States during the North American Free Trade Agreement (NAFTA). It should be noted that these negotiations were actually bilateral, between the United States and Mexico, and Canada and Mexico as Canada and the United States had already negotiated a Free Trade Agreement. It should also be noted that NAFTA was a general trade agreement and not simply an agricultural agreement although agriculture became major issues during negotiations.

Phase	United States	Cairns Group	European Community
Initial Position (1987-88)	Eliminate all policies distorting agricultural trade in 10 years (e.g., zero option proposal)	Three step proposal: <ul style="list-style-type: none"> • Freeze restrictions on market access and on all export and production subsidies • Priority be given to phase-out of subsidies and enlargement of import access • Reform of rules to prohibit non-tariff barriers in 10 years 	Significant and concerted reduction in support and reduction in subsidies encouraging over production (e.g., support reduction, without CAP reform)
Midterm Review (1988-1989)	Abandoned zero option. Accepted target of substantial and progressive reductions in agricultural support and protection. Proposed tariffication.	No change	Re-balancing of protection to reduce existing distortions (e.g., still preserving existing CAP arrangements)
Pre-Brussels (1990)	Proposed that internal support be reduced by 75% , border protection by 75%, and export subsidies reduced by 90%.		Cut internal support at EC level by 10 - 30% over 10 years (from 1986 to gain credit from mid-1980s attempts on reform)
Resumed Negotiations (1991-92)	Insistence on EC agreeing to support reduction, but willingness to settle for lower level of roll back.		Eventual capitulation June 1992 with proposal to cut internal support by up to 30%

Note: The Cairns Group consists of Argentina, Australia, Bolivia, Brazil, Canada, Chile, Colombia, ,Costa Rica, Guatemala, Indonesia, Malaysia, New Zealand, Paraguay, Philippines, South Africa, Thailand, Uruguay.

Figure 4.2 Positions of the main negotiating groups in the Uruguay Round of the GATT (Le Heron 1994:182).

Avery's study concentrated on the U.S.-Mexico negotiations focusing on the agri-food negotiations. Avery breaks down American interests into two coalitions at the domestic level, or Level II. On the one side was the pro-NAFTA coalition, consisting of market-opening supporters including business leaders, congressional supporters (principally Republicans), some environmentalists and some major agricultural groups, and led by the White House and then-President George Bush (Avery 1996:117). More than 500 corporations and lobbyists formed the Coalition for Trade Expansion under the pro-NAFTA coalition. Both the National Wildlife Federation and the Environmental Defense Fund were members, actively working with the White House to ensure NAFTA included environmental safeguards. Support from the agricultural community was drawn from export-driven sectors including, most importantly, grains and oilseeds. Finally, according to public opinion polls at the time, the majority of American citizens supported NAFTA (although Avery does not include actual numbers to support this claim) (Avery 1996).

On the other side was the anti-NAFTA coalition, named the Citizen Trade Campaign, consisting of "more than fifty organizations representing labour unions, environmental and consumer advocacy groups, and certain agricultural sectors" (Avery 1996:120). This Campaign was led by the American Federation of Labor (AFL). Opposition from the agricultural community was diverse and linked, as was the case for those supporting NAFTA, to specific commodities including producers of sugar, dairy products, cotton and peanuts. In earlier negotiations with Canada that had produced the

Canada-US Free Trade Agreement, these products had been excluded under Section 22 by mutual agreement. Also in opposition to NAFTA were fresh fruit and vegetable growers. Prior to NAFTA these growers were protected by seasonal tariffs, applied during the American harvest, thereby protecting domestic producers from head-to-head competition with Mexican produce during that season. Those most vocal in their opposition were Florida's orange growers and California's avocado growers. In addition to these sectors, the National Farmers Union opposed the idea of free trade. Politically, the majority of Democrats were in opposition as well.

Ratification at Level II is a cumbersome undertaking in the United States. Unlike the British parliamentary system, as it exists in Canada, where a party forms a government and more often than not, this party enjoys a majority of seats in the House of Parliament thereby allowing the government to pass any bills (theoretically) with ease, this is not the case in the U.S. with its systems of checks and balances as conceived within the Federalist Papers. As Avery observed, "Ratification of international agreements takes place within an institutional context of norms, rules and procedures that affect the size of the win-set" (Avery 1996:123). This includes approval by a two-thirds majority in the Senate. The need to secure that two-thirds majority requires greater negotiation and consensus.

How, then, could ratification be achieved? To put it crudely, the American administrations of Bush, and then Clinton, bought off selective opponents and undertook an effective public relations campaign designed to manufacture "generic good will" towards free trade (Avery 1996:127). Political concessions secured greater

support in both the House of Representatives and the Senate. Environmental groups softened their stance as they received assurances of more stringent environmental safeguards. The United States steadfastly refused to include exemptions in Level I negotiations as it had with Canada, making it difficult to secure the support of those agricultural sectors aligned in opposition. However, a strategy combining favourable phase-in timetables of concessions, side agreements and side payments was applied to secure the essential majority in the private sector and in the agricultural community specifically. These initiatives were seen as concessions to those groups whose support could provide the vital support for the agreement that would ensure its passage.

After expressing skepticism over NAFTA during the 1992 election, the newly-elected President, Bill Clinton, opted to expand the White Strategy for ratification by negotiating side agreements with Mexico on environmental and labour principles thereby avoiding re-opening the agreement to general negotiations, and offering up side-payments to secure Congressional support. For example, in order to secure the support of Florida's 23 member delegation, Clinton made six commitments:

“(1) protection for Florida vegetables during ongoing negotiations with other trading partners under the GATT; (2) not to grant special trade preferences in these products to developing countries in the future; (3) not to grant preferential treatment for these products in the event the U.S. trade embargo against Cuba is lifted; (4) to finance more research on alternatives to methyl bromide, a fumigant that is scheduled to be banned by 2000; (5) to include more vegetables in the federal school lunch program; (6) and to fund a \$20 million agricultural research center in Fort Pierce, with a major emphasis on research of Florida crops.” (Avery 1996:131)

A second concession was made to the sugar lobby to secure the support of the 12 representatives who constituted the ‘sweetener caucus’ in the form of a pledge from Mexico that its soft-drink industry would not switch to alternate high fructose

sweeteners and market surplus sugar from sugar beets and cane in the United States. A third deal reached with the Mexican government to open negotiations to reduce tariffs on wines secured the support of some Californian representatives while other deals concentrated on individual representatives including, as an example, one representative securing an urban renewal project for his district in exchange for his vote. Avery cites a report by Ralph Nader's Public Citizen, that listed 21 separate side deals made to gain the ratification of NAFTA in Congress (Avery 1996). What Avery's study suggests is not simply the importance of negotiation and consensus-building, but the political nature of these processes as they are embodied in Regulation Theory.

4.3 A Regulationist view of the globalisation of agri-food

To Le Heron, the globalisation perspective contains several important dimensions beginning with a consideration of "the circulation of capital and its regulation, the technological and organizational foundations of production and consumption, and changes in the 'natural' environment resulting from human intervention" (Le Heron 1994:16). He continues:

"The character of these broad dimensions has steadily but fundamentally changed under capitalism, in sometimes simple though mostly complex ways. The perspective regards capitalist forces as a powerful dynamic in contemporary change, in so far as the general logic of a quest for profits and efficiency influences and guides decision making, in most spheres of industrialized countries. By the same token, the emphasis on the multi-dimensionality of globalization, provides a more complete overview of techno-economic processes in their socio-institutional settings, without privileging one dimension to the exclusion of others. Indeed, globalization is an historical tendency, co-determined by multiple and intersecting processes in the economic and governmental spheres, which has had varied temporal and spatial expression in different areas of the world." (Le Heron 1994:16)

A global perspective is crucial given that

“increasingly the historical forces organising agriculture are global forces; increasingly the main organizations bringing about significant changes in agriculture are organized globally; and increasingly the historical form of agriculture in this era involves the organization of integrated, often global, agro-production systems.” (Le Heron 1994:190)

The central focus of Le Heron is the nature of regulation and the process through which the emerging global regulatory framework can be successfully crafted so as to provide the necessary stability to a global regime within which his “capitalist forces” can operate. He contends that the “political economy work in the 1990s continues to suggest that the globalisation framework offers a useful entry point into the technological, organizational, environmental and consumption dilemmas of late capitalism” (Le Heron 1994:7). Any examination of globalised agri-food must therefore include a consideration of the global capitalist accumulation process and the dynamics of these capitalist forces as well as the regulatory arrangements of global agri-food as these impact directly upon the accumulation process. His modes of regulation might thus be seen as hegemonic insofar as these represent those structures through which stability is achieved for extended periods of time. It has not, however, been the purpose of either Le Heron’s study or this work to delve into the details associated with the evolution of this globalised agri-food regulatory framework. As Le Heron acknowledges, his own work is concerned with “macro-theoretical issues” (Le Heron 1994:205) associated with this globalisation.

The adoption of agri-commodity “chains” as the essential structural framework of agri-food production further supports a macro-level analysis. This reflects the increasing complexity of agri-food and its integration into the capitalist structures within which

other sectors of an economy already operate and can be seen as an outcome of the global agri-food regime as it is founded upon capitalism and its social, economic and political dynamics. These chains can be organized within a single entity, an integrated trans-national corporation, or as a series of arrangements between corporate entities either through contractual arrangements or via the marketplace, or in some other form.

In his analysis, Le Heron privileges certain actors. These essentially consist of aggregate social units – organizations (including producer, manufacturer, farm input, processing, distribution, retailing, trade, political parties and even consumer organizations) instead of the individuals who form these organizations, corporations instead of the heterogeneous sets of corporate networks, governments instead of their various departments or agencies that may have, and often do have, conflicting viewpoints. Importantly, Le Heron does acknowledge that the regulatory approach has the theoretical scope to extend its analysis to consider the relative autonomy of interest associations and their capacity to control agendas, questions of corporate relations between government departments and “stakeholders,” and the rise of policy communities.

Le Heron specifically privileges State governments as the fulcrum of social ordering and regulation. These governments are seen as both the principal sites of domestic negotiations and consensus-building and, in keeping with orthodox geopolitical thought, State governments also retain their role as principal actors in the international arena and negotiations amongst a global ‘community of nations.’ The international forum, centred around the WTO, seemingly provides a neutral site wherein nations engage in global

discourses. Negotiations and consensus-building occur both in the domestic and global theatres, sometimes in competition and other times symbiotically, as State governments seek to reconcile specific domestic interests with transnational interests. This process is illustrated by Avery's application of Putnam's two-level bargaining framework.

Avery's study also illustrates just how political this process truly is. Again, while Le Heron does not specifically address this issue of power, he argues that Regulation Theory has the capacity to conduct such inquiries, quoting Cloke and Little (1990:41) that there exists "considerable scope for studies which attempt to link social relations with policy-making bodies through which they operate and the social groups which experience benefit or disadvantage as a result." Le Heron further suggests that power is exercised through government institutions, which are seen as vehicles for the dominant economic, social and political fractions in society. To Smith, this power is "inscribed in institutional, ideological and economic arrangements, which are the potential resource for the exercise of power (Smith 1990:35). The word "dominant" is extremely important here, hinting at the existence of other forms of economic, social and political factions in a heterogeneous society.

It is interesting to note that, although State governments are privileged in his analysis, Le Heron does raise the possible need for reforming global governance. If the economic forces are creating an increasingly integrated global space economy, how can one reconcile policy and regulatory activities in a manner to create the desired stability? He asks, quite correctly,

“Does the situation where the primary scale of economic processes is global, while the primary site of regulation is national, imply a shift in regulatory emphasis and scope? If the theoretical conclusion that integration on a global scale is a, if not the, present defining feature of global capitalism, then coordination at the global level becomes, to follow the reason of the regulation school, a principal object of regulation by different interests.” (Le Heron 1994:7)

Indeed, this shift is already underway as shall be suggested in the next chapter.

Chapter 5. A Foucaultian Sketch of Globalised Agri-Food

How might Foucault have approached the question of globalised agri-food? What discourses might he have determined to be relevant to food? What non-discursive practices, institutions, regulations, laws, administrative measures, scientific statements and philosophic propositions would he have unearthed through his genealogy through which existing approaches to food production, processing and consumption are perpetuated? Would he have considered food safety practices an extension of the medical gaze he explored in *The Birth of the Clinic*? What forms of power would he have identified as operating within the globalised agri-food structure and who controls these powers?

Admittedly, there are a wide range of actors associated with food, each securing and utilizing differing forms of power. Individuals affirm their power principally through their purchasing habits. Corporations exercise power in several ways including through production decisions relating to the types of food products to be produced, through locational decisions pertaining to their establishments, through procurement practices of the necessary ingredients for their line of food products, and through the processing, distribution and marketing strategies they adopt. Retailers exercise power through the selection of food products and the amount of shelf space allocated in a retail outlet to each. Importers and exporters exercise power through the selection of the food products

to be handled and distributed through the global agri-food trade network.

States exercise power in many crucial ways. Governments provide direct and indirect support to primary producers through income support, marketing and research programs. Governments support food processors, distributors and exporters through agri-food inspection services and export certification programs. Governments support citizens through health safety programs and through the establishment of regulations and standards for foods. Governments protect the national landscape through environmental protection programs to avert the accidental introduction of pests and diseases. Finally, State governments engage in bilateral and multilateral negotiations, negotiating access to domestic markets in return for access to export markets.

All these various actors influence, to varying degrees, the actions of others, or as Foucault would observe, their actions act upon the actions of others. These exercises of power have social and spatial outcomes. The demands of food manufacturers for increasingly specific inputs or ingredients will affect what primary producers decide to grow in the case of crops or raise in the case of livestock. As agri-food has become increasingly globalised, procurement practices of large food manufacturing corporations, influenced by “best price” strategies, have been extended globally. While this global sourcing can lead to greater prosperity for producers in certain regions of the world where costs of production are less at a given moment in time, this has also transformed these same landscapes with one set of food products replacing another, often shifting production from foods destined for local markets to foods serving the needs of export markets. Such shifts in production have social repercussions too. Most

have come at the expense of the local populations and local foodstuffs leading to dramatic changes in rural society in those same parts of the world (cf. Bebbington 1997; Thrupp 1997; Stewart 1997; Page 1997; Raynolds 1997; Marsden 1997; Wilkinson 1997; Hart 1997; Schroeder and Suryanata 1996). Retailers, through “just-in-time” delivery demands, have had a similar impact upon the countryside of other nations quite literally on the other side of the world (Marsden 1997; Boyd and Watts 1997). Finally, the spatial impact of actions of the State and transnational institutions of governance cannot be ignored. Domestic policies, noted above, have a direct influence on primary producer and processor decisions. Trade regimes and agreements also exert considerable pressure upon the production, processing and retailing of foods both domestically and globally that, in turn, impacts on social and spatial order. Regulations, as has been argued by Regulation Theorists, play an important role in this process as do the standards they contain.

It is not possible to undertake a comprehensive analysis of power as employed by this myriad of actors. This sketch will concentrate on the nature of the discourses and associated power within the emerging set of international institutions of governance including the World Trade Organisation and Codex *alimentarius* Commission. It will attempt to answer the question, what does Foucaultian power reveal through the study of regulations and their associated institutions of governance?

5.1 Regulations, standards and the State

Whereas Regulationists study modes of regulation, Foucault would have us consider how regulations come to be, who holds the power at a given moment in time to

‘write’ regulations, and what is the nature of the power inscribed in regulations.

Regulations, simply put, are understood to be both products of power and the means through which power is exercised. In the case of products, these regulations often include standards. The power of these regulations and standards is significant. National standards once served both to rationalize domestic markets by providing quality frameworks for consumers, and as barriers to trade to protect domestic industries and interests. With the evolution of global trade, the role of regulations and standards has been transformed fundamentally from acting as non-tariff barriers to trade to one essential to facilitating trade. As Samuel Krislov observes, “standard setting is obviously part of nation-building, and standards are the specific objects of much, perhaps most, of a nation’s early legislation. But systematic and conscious national standards bearing that name comes subsequent to, and as a by-product of, the success of international standardization” (Krislov 1997:36). Globalisation has necessitated the creation of a common organising language, as it were, for the benefit of manufacturers, traders and consumers alike, a role that has been assumed by standards. The power of regulations and standards had therefore shifted from one arena to another.

Standards are neither strictly scientific nor purely objective. Socially constructed, standards are the outcome of intense negotiations and lobbying in both the national and international theatres between often-conflicting national and transnational interests, as has been noted in the discussion concerning Putnam’s two level bargaining framework in the previous chapter. Standards are also not to be seen as benign. Universal standards can discourage innovation, perpetuate inadequacies, thwart efficiency and entrench

existing modes of production, thereby capturing even clearly advantageous new technology in what Krislov terms an “elephantine process” (Krislov 1997:37). As

Alfred Kahn writes:

“The efforts of trade associations to standardize products, impose quality standards, and prevent fraud all in a sense make markets more nearly perfect. Standardization enables buyers to make intelligent price comparisons; it may also reduce costs of production and distribution. Quality standards may protect buyers from their own ignorance, as well as scrupulous firms from losing business to the unscrupulous. But standardization is also counter-productive if it promotes collusively fixed prices and suppresses socially desirable quality competition. Particularly if they are enforced, as they sometimes are, by concerted refusals to handle the products of transgressors, quality standards may be employed to deny price cutters or product innovators access to the market. All too often trade association “codes of ethics” or of “fair competition” have really tried to suppress all effective rivalry.” (quoted from the *International Encyclopedia of the Social Sciences* in Krislov 1997:16)

The global agri-food regime is not immune from the intrigue surrounding standards and their formulation. New food products, processing methods, ingredients, packaging technology, and storage and shipping technologies, as well as new primary crop and livestock products and shifting demands by consumers, continually alter the global agri-food industry, placing ever increasing demands upon national and international regulatory organizations. One example that illustrates the political struggles associated with standard formulation and its impact in terms of the spatial organization of a specific food product is the Californian “fresh” chicken controversy. This controversy centred on the definition of “fresh” and “frozen” poultry in the United States (Watts and Goodman 1997; Krislov 1997). While the United States Department of Agriculture (USDA) regulations define “frozen” as a product frozen to 0°F, research demonstrated that the freezing point of poultry meat was 26°F. This discrepancy in U.S. federal regulations provided large broiler integrators concentrated in “Old South” of the United States with a loop-hole that enabled them to ship their product frozen to distant markets and market it as “fresh.” This led to conflicts between local producers and these

Southern integrators in the Californian market where “fresh” poultry commanded a premium of 50 cents a pound. As a result of extensive lobbying by Californian interests, the USDA rewrote their poultry regulations in 1988, changing the definition of frozen to poultry frozen to 26°F. Political pressure was subsequently applied by Southern producers who argued that shipping their product above that temperature would result in health safety issues, specifically surrounding the issue of bacteria growth. Southern producers further contested proposed changes in the terminology on labels, including such terminology as “freeze-chilled,” “fresh-frozen” and “chill-packed” as being equally devastating to them. With the federal process slowed at near standstill by the Southern integrators, California passed a state law enforcing the drafted USDA revised standards only to have this law challenged and declared unconstitutional since it impacted on inter-state trade.

This struggle over the meaning of “fresh” and “frozen” also reveals the dynamics of power operating within agri-food between government and capitalist actors. The success of the large, vertically-integrated Southern poultry processors to secure the necessary power to thwart the amendment to the poultry regulations reflects the power these processors enjoyed over smaller Californian processors in influencing U.S. federal governmental action or non-action (Watts and Goodman 1997). Similar struggles over health claims and other label information, quality claims and safety claims are being acted out continually in every major food-producing nation. Such struggles are also being acted out at the international level and take on even greater significance as a country’s entire food industry could be at stake in these negotiations.

It should be noted that much of the following discussion focuses on food safety standards. These differ from quality standards, or those standards of grading food products, although both forms of standards are highly politicized and are subject to

similar manipulations. Quality standards, being organoleptic in nature, can vary dramatically from nation to nation, and even from region to region within a country. Differences in beef grades, for example, between the United States and Canada are based upon differences in the amount of marbling permitted in meat. Safety standards are seen as being based upon health issues that, theoretically, transcend differing nations' "tastes" and national quality standards.

5.2 Three forms of power in globalised agri-food

The regulatory framework of global trade is commonly seen as organized around the World Trade Organization (WTO). However, as has been noted in chapter three, this is not the case. Global trade in agri-food is also regulated through two other key agreements: the *Agreement on the Application of Sanitary and Phytosanitary Measures* (commonly known as the SPS Agreement) and the *Agreement on Technical Barriers to Trade* (the TBT Agreement). Through these Agreements the WTO has transferred specific responsibilities to other international institutions. The SPS Agreement, which deals with agri-food safety issues as these affect humans, animals and plant life, specifically assigns the Codex *alimentarius* Commission with responsibility for the development of such standards for foods, the International Office of Epizootics (OIE) with responsibility for the development of international standards regarding animal health and the International Plant Protection Convention (IPPC) with responsibility for the development of international standards for plant health. Responsibility for actions under the TBT Agreement have also been partly devolved to Codex.

Consequently, the global institutional framework consists of a network of distinct centres, engaged in differing, yet interconnected, discourses – a political discourse in the

WTO, and a scientific discourse in Codex, the OIE and the IPPC. In addition, a third discourse has emerged that is associated with the scientific discourse of Codex, the OIE and the IPPC: a technical discourse organized around the International Organization of Standards (ISO). This third discourse is concerned with how the new food safety systems will be designed, evaluated and monitored for compliance. It is within these centres that struggles over power are focused, although this power extends outwards to regional blocs and into the realm of the State. The remainder of this section will seek to consider the nature of power related to these three discourses and their three associated centres: the WTO, the Codex and the ISO.

5.2.1 Power and the political discourse of the WTO

The WTO is considered as the principal international organization dealing specifically with the rules of international trade. Its objective is to ensure that such trade flows as smoothly and freely as possible so as to create a “more prosperous, peaceful and accountable economic world” (WTO 2002a). The agreements reached at the WTO form the legal ground-rules for international trade. These guarantee member countries specific trade rights. The WTO administers global trade agreements, acts as a forum for trade negotiations, settles trade disputes, reviews national trade policies for adherence to international agreements, assists developing countries in trade issues through both technical assistance and training programs, and co-operates with other international organizations (WTO 2002b).

The political discourse of the WTO is similar to Le Heron’s regulatory/globalisation perspective:

“Virtually all decisions in the WTO are taken by consensus among all member countries and they are ratified by members’ parliaments. Trade friction is channeled into the WTO’s dispute settlement process where the focus is on interpreting agreements and commitments, and how to ensure that countries’ trade policies conform with them. That way, the risk of disputes spilling over into political or military conflict is reduced.” (WTO 2002a)

This description contains several key aspects of the WTO. First, the WTO is organized around the principle of sovereignty. It consists of States that are accepted as members. However, not all states are members. At present, the WTO has more than 140 member nations which account for 97 percent of world trade. Another 30 nations are currently negotiating membership. Second, decisions are made by the entire membership principally through consensus-building. Although votes are permitted, these have yet to be used at the WTO. Third, all decisions made at the WTO must also be ratified by each Member State’s national government, again in accordance with the principle of sovereignty. Fourth, and finally, the WTO contains a recognized settlement process to mediate disputes between States.

The WTO is neither a simple, nor a neutral, forum in which member States interact. It is, in reality, highly complex in both its structure and its scope. The organizational structure of the WTO is presented in Figure 5.1. All WTO member States can participate in all WTO councils and committees except for the Appellate Body and Dispute Settlement Panels, the Textile Monitoring Body and Plurilateral Bodies. The top-level decision-making body is the *Ministerial Conference*, consisting of government leaders, which meets at least once every two years. Reporting to this Conference is the *General Council*, in which member countries are represented by ambassadors of heads of delegation. Centred in Geneva, Switzerland, this Council meets several times a year.

Figure 5.1 The organization of the World Trade Organization (WTO 2002a).

The General Council also forms the *Trade Policy Review Body* and the *Disputes Settlement Body*. A *Secretariat*, also based in Geneva, Switzerland, provides technical support for the ministerial conferences, the various councils and committees, and technical assistance to developing countries. In addition, the Secretariat provides some forms of legal assistance for the dispute settlement process if so requested. Most States, but not all, maintain a delegation at the WTO that includes a Head and a team of experts.

The discourse of trade does not take place solely in the international forum in the hands of these delegations. It links back to domestic discourses, as noted by Avery (1996), where trade policies and negotiating positions are formulated. Furthermore, regional structures, including the European Union (EU); the Association of South East Asian Nations (ASEAN); the Latin American Economic System; the African, Caribbean and Pacific Group; the Southern Common Market (MERCOSUR); and, of course, the North American Free Trade Agreement (NAFTA), are all gaining a 'voice' at the WTO. In some cases, such as the EU, these regional blocs are represented by a single spokesperson or negotiating team while other blocs, such as MERCOSUR and NAFTA, have not yet reached that level of integration.

Nor are the dynamics associated with the WTO restricted to its formal sessions. Informal meetings are also seen as an essential part of the political discourse that takes place in the WTO. While these are open to the full membership, more difficult issues are often resolved by smaller groups of States:

"For much of the Uruguay Round, a system of so-called Green Room meetings was established, involving perhaps as many as 40 countries most interested in the particular issue under discussion. Occasionally a deadlock can only be broken in a small group of two, three or four countries, sometimes at meetings they have organized themselves in their

own countries. In a market access negotiation, where the final outcome is a multilateral package of individual countries' commitments, those commitments are the result of numerous bilateral, informal bargaining sessions. To this day, informal consultations in various forms play a vital role in allowing consensus to be reached, but they never appear in organization charts. They are not separate from the formal meetings, however. They are necessary for making formal decisions in the councils and committees. Nor are the formal meetings unimportant. They are the forums for exchanging views, putting countries' positions on the record, and ultimately for confirming decisions. The art of achieving agreement among all WTO members is to strike an appropriate balance, so that a breakthrough achieved among only a few countries can be acceptable to the rest of the membership." (WTO 2002c)

An example of the importance of this process was provided in chapter three and the Blair House Agreement which ultimately lead to the Marrakesh Agreement.

Dispute settlement represents a second crucial aspect of the WTO. To Renato Ruggiero, former WTO director general, the dispute settlement procedure the WTO represents the most important contribution to the stability of the global economy (WTO 2002b). Simply put, without effective enforcement, any rules-based system is worthless. This procedure is summarized in Figure 5.2. Whereas under the previous GATT procedure rulings could only be adopted by unanimous consensus, the Marrakesh Agreement made it impossible for the country losing a case to block the adoption of the ruling. Any country wanting to block a ruling now needs to convince other WTO members, including the State that filed the initial complaint, to agree (WTO 2002c).

Again, the WTO looks to negotiation between disputing States as the preferred form of resolution over the application of any 'rule of law:'

"Although much of the procedure does resemble a court or tribunal, the preferred solution is for the countries concerned to discuss their problems and settle the dispute by themselves. The first stage is therefore consultations between the governments concerned, and even when the case has progressed to other stages, consultation and mediation are still always possible. Settling disputes is the responsibility of the Dispute Settlement Body (the General Council in another guise). The Dispute Settlement Body has the sole authority to establish "panels" of experts to consider the case, and to accept or reject the panels'

findings or the results of an appeal. It monitors the implementation of the rulings and recommendations, and has the power to authorize retaliation when a country does not comply with a ruling.” (WTO 2002c)

However, an international ‘rule of law’ can be imposed under the WTO if the States cannot resolve a dispute. The authority to establish panels of experts to rule on disputes demonstrates the emergence of the WTO as an actant of power itself. The replacement of the General Agreement on Tariffs and Trade (GATT) by the WTO raised concern among critics who saw in its stronger enforcement powers a fundamental shift in power from national governments to a global authority portrayed as being run by unelected bureaucrats. These critics cited stronger enforcement mechanisms, and specifically dispute resolution panels, that were seen as being composed of a select few “trade experts” and who conduct hearings and make rulings *in camera* as an example of this creeping internationalism. The assertion of international agreements over national legislation was another concern raised by critics. Under the WTO, member countries have the right to challenge other countries’ local, state, or federal laws if these are interpreted as impediments to international trade. If the WTO finds any such law to be in conflict with WTO agreements, the State government of the infringing nation is expected to repeal the law or face potential trade sanctions. This shift in power to a global-level bureaucracy is seen as undermining what is often understood as the right of a nation to legislate laws it perceives as essential for protecting the welfare of its citizens.

<p>First stage: consultation (up to 60 days).</p>	<p>Before taking any other actions the countries in dispute have to talk to each other to see if they can settle their differences by themselves. If that fails, they can also ask the WTO director-general to mediate or try to help in any other way.</p>
<p>Second stage: the panel (up to 45 days for a panel to be appointed, plus 6 months for the panel to conclude).</p>	<p>If consultations fail, the complaining country can ask for a panel to be appointed. The country “in the dock” can block the creation of a panel once, but when the Dispute Settlement Body meets for a second time, the appointment can no longer be blocked (unless there is a consensus against appointing the panel).</p> <p>Officially, the panel is helping the Dispute Settlement Body make rulings or recommendations. But because the panel’s report can only be rejected by consensus in the Dispute Settlement Body, its conclusions are difficult to overturn. The panel’s findings have to be based on the agreements cited.</p> <p>The panel’s final report should normally be given to the parties to the dispute within six months. In cases of urgency, including those concerning perishable goods, the deadline is shortened to three months.</p> <p>The main stages are:</p> <p>1.81 Before the first hearing: each side in the dispute presents its case in writing to the panel.</p> <p>1.82 First hearing: the case for the complaining country and defense: the complaining country (or countries), the responding country, and those that have announced they have an interest in the dispute, make their case at the panel’s first hearing.</p> <p>1.83 Rebuttals: the countries involved submit written rebuttals and present oral arguments at the panel’s second meeting.</p> <p>1.84 Experts: if one side raises scientific or other technical matters, the panel may consult experts or appoint an expert review group to prepare an advisory report.</p> <p>1.85 First draft: the panel submits the descriptive (factual and argument) sections of its report to the two sides, giving them two weeks to comment. This report does not include findings and conclusions.</p> <p>1.86 Interim report: The panel then submits an interim report, including its findings and conclusions, to the two sides, giving them one week to ask for a review</p> <p>1.87 Review: The period of review must not exceed two weeks. During that time, the panel may hold additional meetings with the two sides.</p> <p>1.88 Final report: A final report is submitted to the two sides</p>
<p>Appeals</p>	<p>Either side can appeal a panel’s ruling. Sometimes both sides do so. Appeals have to be based on points of law such as legal interpretation – they cannot reexamine existing evidence or examine new evidence.</p> <p>Each appeal is heard by three members of a permanent seven-member Appellate Body set up by the Dispute Settlement Body and broadly representing the range of WTO membership. Members of the Appellate Body have four-year terms. They have to be individuals with recognized standing in the field of law and international trade, not affiliated with any government.</p> <p>The Dispute Settlement Body has to accept or reject the appeals report within 30 days – and rejection is only possible by consensus.</p>

Figure 5.2 Dispute settlement procedure (summarized from WTO 2002c).

What, then, can be said about power as it pertains to the World Trade Organization? From the above overview, power as it is performed in the WTO can be understood in two senses: power performed within the organizational apparatus of the WTO and the power performed through the agreements and regulations of the WTO. Concerning first the power within the organizational structure of the WTO, it is important to remember at the outset that not all States are members of the WTO. Furthermore, not all Member states have the same resources to dedicate to WTO negotiations and activities. So, one must ask which States are capable of securing the power to pursue specific trade agendas? Which State, or group of States, have adequate resources to participate in the 'Green Rooms'? Which State, or group of States, can secure a consensus? Furthermore, how is this consensus achieved? Finally, how do these questions of power and influence reach back into the domestic arenas of States where trade positions are negotiated and, in some cases, to regional blocs? As was raised during the discussion concerning Putnam, therefore, the question of who is at the bargaining table – that is, the question of inclusion/exclusion – both at the domestic and the international levels of governance, is crucial to the exploration of power dynamics.

At the same time, agreements reached at the WTO are, effectively, global in their enforcement. In the case of globalised agri-food, aspects of State sovereignty have been transferred to the WTO in exchange for perceived benefits related to “freer” trade in agri-food products, freer as defined by the absence of not only tariff barriers but also the absence of ethical and moral considerations. As a result of these agreements, the WTO itself has become a principal centre of power, its agreements defining the set of possible

actions Member States can adopt as these relate to trade. The scope of power that the WTO has successfully secured is reflected in the appeals framework. Although States are encouraged to continue to negotiate resolutions to trade disputes between themselves, the creation of resolution panels of trade experts represents a major transferal of power from State to an international institution of governance. It should also be noted that similar panels and processes are appearing in regional agreements such as NAFTA.

Finally, the political discourse of the WTO raises philosophical questions. By drawing upon a neo-liberalism derived from a European intellectual tradition, one final, crucial question is raised: who decides upon the agenda? Is it States, or a broader spectrum of actors, who share the power to define the principles of global trade? Perhaps in answering this question it would be necessary to include the myriad of lobby organizations representing various corporations and sectoral interests who share this power, exerting pressures upon States to adopt certain principles of trade that define the global trade regime.

5.2.2 Power and the scientific discourse of *Codex alimentarius*

The *Codex alimentarius*, the IEO and IPPC represent another constellation of centres in this global regulatory framework. In this section, only Codex will be considered although much of what is said of Codex applies to the other two centres as well.

Food safety plays an important role in today's global regulatory framework and it is Codex that is acknowledged as the principal international institution through which global sanitary and phytosanitary standards for agri-food products are developed. A State's commitment to the harmonization of these standards is referred to in both Articles 2.2 and 3.1 of the SPS Agreement and Article 2.6 of the TBT Agreement. Adherence to Codex standards is also incorporated into regional agreements including NAFTA, MERCOSUR and ASEAN. Furthermore, APEC has drafted a Mutual Recognition Arrangement on Conformity Assessment of Foods and Food Products that calls for consistency with the SPS and TBT Agreements signed at Marakesh, and EU directives frequently refer to the Codex *alimentarius* as the basis for their requirements.

The Codex *alimentarius* Commission was created in 1963 by the United Nations' Food and Agriculture Organization (FAO) and the World Health Organization (WHO) and was assigned the specific task of developing food standards, guidelines and related texts, such as codes of practice under the Joint FAO/WHO Food Standards Programme that: first, protect the health of the global consumers; second, ensure fair trade practices in the food trade; and third, promote the harmonization of food standards work internationally. The Code, itself, is complex, as reflected in both the organization of the Codex and the active committees of the Commission (see Figure 5.3. Organization and current committees of Codex).

The discourse of Codex is scientific. As an example of this discourse, consider the terms of reference for the *Codex Committee on Food Hygiene* whose mandate is:

“(a) to draft basic provisions on food hygiene applicable to all food; (b) to consider, amend, if necessary, and endorse provisions on hygiene prepared by Codex commodity committees and contained in Codex commodity standards, and (c) to consider, amend if necessary, and endorse provisions on hygiene prepared by Codex commodity committees and contained in Codex codes of practice unless, in specific cases, the Commission has decided otherwise, or (d) to draft provisions on hygiene applicable to specific food items or food groups, whether coming within the terms of reference of a Codex commodity committee or not; (e) to consider specific hygiene problems assigned to it by the Commission; (f) to suggest and prioritize areas where there is a need for microbiological risk assessment at the international level and to develop questions to be addressed by the risk assessors; and, (g) to consider microbiological risk management matters in relation to food hygiene and in relation to the risk assessment of FAO and WHO. (The term "hygiene" includes, where necessary, microbiological specifications for food and associated methodology.)” (Codex 2002b)

In its Strategic Framework, 2003-2007, Codex re-iterated the centrality of science as follows:

“6. The fundamental objective of the Codex Alimentarius Commission is to establish sound internationally agreed guidelines for national food control systems based on the criteria of consumer health protection and fair practices in trade and taking into account the needs and special concerns of all countries. All of the objectives listed below are considered to be equally important to the overall achievement of the strategic vision.” (Codex 2002c)

This includes promoting sound regulatory frameworks by all member states; promoting the widest and most consistent application of scientific principles and risk analysis; promoting linkages between Codex and other multilateral regulatory instruments and conventions; enhancing the capacity of the global community to respond effectively and expeditiously to new issues, concerns and developments in the food sector; promoting maximum membership and participation in Codex activities; and promoting maximum application of Codex standards on a global scale.

Organization of the Codex Alimentarius: <ul style="list-style-type: none"> • Volume 1A - General requirements • Volume 1B - General requirements (food hygiene) • Volume 2A - Pesticide residues in foods (general texts) • Volume 2B - Pesticide residues in foods (maximum residue limits) • Volume 3 - Residues of veterinary drugs in foods • Volume 4 - Foods for special dietary uses (including foods for infants and children) • Volume 5A - Processed and quick-frozen fruits and vegetables • Volume 5B - Fresh fruits and vegetables • Volume 6 - Fruit juices • Volume 7 - Cereals, pulses (legumes) and derived products and vegetable proteins • Volume 8 - Fats and oils and related products • Volume 9 - Fish and fishery products • Volume 10 - Meat and meat products; soups and broths • Volume 11 - Sugars, cocoa products and chocolate and miscellaneous products • Volume 12 - Milk and milk products • Volume 13 - Methods of analysis and sampling 	
Active committees of the Codex (host country in brackets): <ul style="list-style-type: none"> • Ad Hoc Intergovernmental Task Force on Animal Feeding • Ad Hoc Intergovernmental Task Force on Food Derived from Biotechnology • Ad Hoc Intergovernmental Task Force on Fruit and Vegetable Juices • Codex Alimentarius Commission • Codex Committee on Cereals, Pulses and Legumes (United States) (V) • Codex Committee on Cocoa Products and Chocolate (Switzerland) (V) • Codex Committee on Fats and Oils (United Kingdom) (V) • Codex Committee on Fish and Fishery Products (Norway) (V) • Codex Committee on Food Additives and Contaminants (Netherlands) (H) • Codex Committee on Food Hygiene (United States) (H) • Codex Committee on Food Import and Export Inspection and Certification Systems (Australia) (H) • Codex Committee on Food Labeling (Canada) (H) • Codex Committee on Fresh Fruits and Vegetables (Mexico) (V) • Codex Committee on General Principles (France) (H) • Codex Committee on Meat and Poultry Hygiene (New Zealand) (V) • Codex Committee on Processed Meat and Poultry Products (Denmark) (V) • Codex Committee on Methods of Analysis and Sampling (Hungary) (H) • Codex Committee on Milk and Milk Products (New Zealand) (V) • Codex Committee on Natural Mineral Waters (Switzerland) (V) • Codex Committee on Nutrition and Foods for Special Dietary Uses (Germany) (H) • Codex Committee on Pesticide Residues (Netherlands) (H) • Codex Committee on Processed Fruits and Vegetables (United States) (V) • Codex Committee on Vegetable Proteins (Canada) (V) • Codex Committee on Residues of Veterinary Drugs in Foods (United States) (H) • Codex Committee on Soups and Broths (Switzerland) (V) • Codex Committee on Sugars (United Kingdom) (V) • Executive Committee of the Codex Alimentarius Commission • FAO/WHO Coordinating Committee for Africa (R) • FAO/WHO Coordinating Committee for Asia (R) • FAO/WHO Coordinating Committee for Europe (R) • FAO/WHO Coordinating Committee for Latin America and the Caribbean (R) • FAO/WHO Coordinating Committee for Near East (R) • FAO/WHO Coordinating Committee for North America and South West Pacific (R) 	

Legend: H = Horizontal Committee; V = Vertical Committee; R = Regional Committee

Figure 5.3 Organization and current committees of Codex (host country) (Codex 2002b).

Under its Rules of Procedure, the Commission is empowered to establish two kinds of subsidiary bodies: *Codex Committees*, which prepare draft standards for submission to the Commission; and *Coordinating Committees*, through which regions or groups of countries coordinate food standards activities in the region, including the development of regional standards. Each committee is hosted by a Member Country which is responsible for the cost of the committee's maintenance and administration, and for providing its chairperson. There are two types of Codex Committees: *Commodity Committees*, whose work addresses specific food types, and *General Subject Committees*, whose work is relevant for all Commodity Committees. Among other things, the *General Subject Committees* develop cross-commodity concepts and principles applying to foods in general, specific foods or groups of foods; endorse or review relevant provisions in Codex commodity standards and, based on the advice of expert scientific bodies, develop major recommendations pertaining to consumers' health and safety. Since this work applies across the board to all commodity standards these are sometimes referred to as "horizontal committees." Currently, there are nine such General Committees. *Commodity Committees* are responsible for developing standards for specific foods or classes of food. In order to distinguish them from the "horizontal committees" and recognize their exclusive responsibilities, they are often referred to as "vertical" committees. Currently, there are 13 such active committees (see Figure 5.3) (Codex 2002c).

Codex concentrates on standards development, specifically as these relate to safety, as opposed to quality standards. Increasingly defined by what proponents describe as

value-neutral and objective science, the internationalization of safety standards is being legitimized and pursued by private and public interests alike within the global regulatory network. However, this discourse is not limited to the development of safety standards for biological, chemical and physical contaminants of foods, or maximum levels of contaminants permitted in food products. Of greater significance is the emerging global hegemony of a specific scientific methodology, known as Hazard Analysis Critical Control Point, or HACCP. HACCP methods are TQM approaches that seek to replace end-product testing with a systematic, scientifically-based preventative approach to safety. HACCP consists of seven basic steps which focus on the scientific identification and systematic management of biological, chemical and physical hazards throughout a particular food product's production system (Figure 5.4 The HACCP approach). HACCP also includes detailed pre-requisite programs through which the safety aspects of a food establishment and employees are managed. The actual "steps" employed in a specific model can vary from nation to nation. The Canadian generic models, for example, are highly detailed, consisting of a series of generic forms (Figure 5.5 The Canadian HACCP schemata).

The history of HACCP is interesting. The idea of such a total safety system was first raised in the 1960s by Pillsbury when the company was contracted by NASA to prepare and produce the foods used on the first Mercury space flights. By the Apollo missions, HACCP had been fully developed conceptually. Scarcely two years following the first moon landing, Pillsbury had implemented HACCP programs in its commercial establishments. In 1974, HACCP was endorsed in the United States by the Food and

Drugs Administration (FDA). By 1985, United States National Academy of Science recommended that HACCP be adopted in all food processing establishments as the means of ensuring food safety. Since its inception, HACCP has also gained international legitimacy. At the twentieth session of *Codex alimentarius* in Geneva, Switzerland, June 28-July 7, 1993, the international community adopted *Guidelines for the Application of the Hazard Analysis Critical Control Point (HACCP) System* (Codex 1995b). In addition to its grounding in scientific objectivity and its flexibility of application, HACCP was seen at that meeting as compatible with the implementation of quality management systems, as being created under the International Organization for Standardization's ISO 9000 series.

The ultimate outcome of HACCP approach is the creation of a food safety management plan specifically designed for a specific food product manufactured within a specific food establishment. As summarized in Form 10 (Figure 5.5), this Plan consists of a summary of all critical control points identified during the HACCP analysis including a description of each relevant hazard, the critical acceptable limits of these hazards in the food or food processing system, the monitoring procedures to be employed by the food establishment, the deviation procedures to be undertaken if the critical acceptable limit for the hazards is exceeded, the verification procedures through which the hazard is monitored on a regular basis, and all HACCP records required to record the ongoing surveillance of the HACCP system in the specific establishment. It must further list the scientific knowledge and technological means with which pathogens and other contaminants will be managed.

Principle 1.	Identify the potential hazards associated with food production at all stages, from growth, processing, manufacture and distribution to the point of consumption. Assess the likelihood of occurrence of the hazards (risk assessment) and identify preventive measures for their control (risk management).
Principle 2.	Determine the points, procedures and operational steps that can be controlled to eliminate the hazards or minimize their likelihood of occurrence; these are the critical control points (CCPs). A “step” means any stage in food production and/or manufacture including receipt and/or production of raw materials, harvesting, transport, formulation, processing, storage, etc.
Principle 3.	Establish critical limits which must be met to ensure that the CCPs are under control.
Principle 4.	Establish a system to monitor control of CCPs by scheduled testing or observations.
Principle 5.	Establish the corrective action to be taken when monitoring indicates that a particular CCP is not under control.
Principle 6.	Establish procedures for verification that include supplementary tests and procedures to confirm that the HACCP system is working effectively.
Principle 7.	Establish documentation concerning all procedures and records appropriate to these principles and their application.
Prerequisite Programs.	Six basic prerequisite programs must be developed under HACCP: premises (outside property, building, sanitary facilities, water/steam/ice quality programs); transportation and storage (food carriers, temperature control, storage of incoming materials, non-food chemicals and finished product); equipment (general equipment design, equipment installation, equipment maintenance and calibration); personnel (training, hygiene and health requirements); sanitation and pest control (sanitation program, pest control program); and recalls (procedures and distribution records).

Figure 5.4 The HACCP approach (Source: Whitehead and Orriss 1997).

The application of HACCP is seen as essential to the modern global agri-food regime. To Deming (1986), traditional end-product inspection is self-defeating as government budgets fail to keep pace with industry demands. To accommodate advances in technology and a global agri-food regime that is increasingly driven by flexible production and just-in-time principles, new comprehensive and science-based risk management strategies are being endorsed by governments and adopted by the private sectors in many countries including Canada. The Canadian Food Inspection Agency, for example, has aggressively advanced HACCP through several initiatives including: the Canadian Food Enhancement Safety Program (CFSEP) that underwrote the adoption of HACCP-based systems by food processing establishments; the

Form 1. Product Description	Information concerning: Product name(s), important product characteristics (a_w , pH, salt, preservatives, etc.), how it is to be used, packaging, shelf life, where it is to be sold, labeling instructions and special distribution information.
Form 2. List of Product Ingredients and Incoming Material	Information concerning all principal products, bacterial agents, ingredients, packaging materials.
Form 3. Process Flow Diagram	The schematic reproduction of the mode of production to be employed in the specific establishment.
Form 4. Plant Schematic	A reproduction of the floor plan and processing lines of the specific establishment.
Form 5. Hazards Identification, Biological Hazards	Lists all biological hazards related to ingredients, incoming material, processing and product flow and identifies where and how these are to be managed.
Form 6. Hazards Identification, Chemical Hazards	Lists all chemical hazards related to ingredients, incoming material, processing and product flow and identifies where and how these are to be managed.
Form 7. Hazards Identification, Physical Hazards	Lists all physical hazards related to ingredients, incoming material, processing and product flow and identifies where and how these are to be managed.
Form 8. Critical Control Points (CCPs) Determination	<p>A step-by-step analysis of the processing line, beginning with all incoming materials and continuing to final product distribution. Once a hazard has been identified, the analysis consists of five questions:</p> <ol style="list-style-type: none"> 1. Can the hazard be managed by prerequisite program(s)? If YES, then the prerequisite program is identified; if NO, then the analysis continues to question two. 2. Could a control measure(s) be used by an operator at any process step? If NO, then it is not a CCP; identify how this hazard will be controlled before and after the process and proceed to the next hazard. If YES, describe and continue to question three. 3. Is it likely that contamination with the identified hazard could occur in excess of the acceptable level or could increase to an unacceptable level? If NO, then it is not a CCP; proceed to the next hazard. If YES, describe and continue to question four. 4. Is this process step specially designed to eliminate/reduce the likely occurrence of the identified hazard to an acceptable level? If NO, go to question five. If YES, then this is a CCP. 5. Will a subsequent step eliminate the identified hazard or reduce likely occurrence to an acceptable level? If NO, then this is a CCP. If YES, it is not a CCP and identify the subsequent step and proceed to the next identified hazard.
Form 9. Hazards not Controlled by Operator	Lists all biological, chemical and physical hazards which are not controlled by the establishment operator and how these could be addressed (producer, shipper, government responsibilities).
Form 10. HACCP Plan	Summarizes all the identified CCPs in Form 8 systematically, including: hazard description, critical limits of the hazard, monitoring procedures, deviation procedures, verification procedures and all HACCP records required to be maintained.

Figure 5.5 The Canadian HACCP schemata (CFIA 2001a).

Canadian On-Farm Food Safety (COFFS) Program, administered by the Canadian Federation of Agriculture, that focuses on the design of generic on-farm HACCP programs; and most recently, the Canadian Food Safety Adaptation Program (CFSAP), a four-year, \$5 million program that is seeking to design, in conjunction with the private sector, comprehensive “gate-to-plate” food safety systems based on HACCP and TQM principles, linking on-farm HACCP-based safety systems right through the agri-food complex to retailing and the foodservice sector.

Power, in Codex can again be explored as both power within the institution and power extending through its science. First, as was true for the WTO, there is the question of membership. Here again, not all States are members and therefore the first question of power is: which States are members and which are not? Membership obviously has its privilege when it comes to developing and formalizing food safety standards. It is possible to take this a step further, raising the question of which States host the committees through which these safety standards are developed for specific food types.

Power is also performed through science, but not simply through a globalising of knowledge related to pathogens and the determination of critical levels of contamination in foods. It is within the emerging HACCP-based food safety regime that the full power of the Codex and its scientific discourse can be understood. The establishment of a universal safety methodology imposes a universalizing safety regime on all foods produced globally which depends upon a specific scientific body of knowledge and set of scientific institutions (laboratories, universities, research facilities), and which

promotes a specific collection of scientifically-determined practices to manage pathogens and other potential contaminants of foods. Furthermore, the impact of this scientific framework is both local and immediate, impacting upon food processing establishments globally.

It is through Codex that a powerful scientific discourse circulates throughout the global framework of agri-food practically uncontested. The importance of food safety is assumed. The acknowledgment of the primacy of Codex in WTO agreements further legitimizes the power of the scientific discourse of food safety. It is a power that not only defines and quantifies the risk of pathogens and other contaminants in food products but also sets out the manner in which these hazards are to be managed, again through a systematic, science-based methodology. And, who, therefore, controls the power of this discourse? It would seem that it is the scientist, and the scientific community.

5.2.3 Power and the technical discourse of the International Organization of Standards (ISO)

From the perspective of Codex, HACCP offers the global agri-food industry with the necessary scientific foundation for managing food hygiene issues (Codex 1995a). From the perspective of the WTO, Codex standards, guidelines and other recommendations represent the baseline standards for consumer protection under GATT's SPS and TBT Agreements.

As noted in the preceding discussion concerning Codex, HACCP, as a TQM approach, focuses on system management strategies rather than end-product testing of agri-food products. Associated, therefore, with the advancement of HACCP has been

the design and introduction of quality management systems within a globalised framework, such as that provided by the International Organization for Standardization's ISO 9000 series. Thus, the design, development and implementation of standardized compliance strategies has emerged as a third important aspect in the new global regulatory framework centred around the ISO and consisting of a technical discourse.

What is interesting about the emergence of the ISO is that it is not part of the international governance structure and yet it is part of the global regulatory regime. It is a private sector organization. ISO standards are developed in accordance with three principles: they are based upon consensus; they are industry-wide and therefore are perceived as representing, upon approval, global solutions to global questions of management practices; and they are market-driven. The ISO initiates development of a standard upon the request of an industry, as forwarded by a State's or collection of States' national standards body/bodies. Upon receiving such a request, the ISO first establishes the technical scope of the future standard and then organizes a technical committee made up of experts from States expressing an interest in the specific field. The detailed specifications are devised through consensus-building within the struck committee. The final phase consists of the formal approval of the draft International Standard. Acceptance requires the approval of two-thirds of the ISO membership who participated in the development of the standard and then three-quarters of the full ISO members. To date, the ISO has drafted 12,000 international standards.

Although it is difficult to predict how HACCP implementation will proceed in the decades ahead, many government and scientific experts suggest that HACCP will become a universal requirement for many high-risk foods including seafood, meat and poultry, dairy products and juices, as well as for many lower-risk foods. Already some States, including Canada and the United States, are moving towards the mandatory application of HACCP for high-risk products. In some countries, such as Japan, HACCP compliance is required in buyer contracts. *De facto* conformity to HACCP principles is also becoming a pre-requisite for international trade for high-risk foods (CFSAP 2002). This makes the design and acceptance of internationally-recognized standards for management and auditing systems for such HACCP models a higher priority for States.

The means through which this new regime of food safety and inspection is evaluated, approved and monitored for compliance and effectiveness is still very much in its embryonic stage, as indicated by the lack of standardization of agreed good practices, recognition mechanisms and even the terminology itself. For example, organizations given the task of assessment and the verification of conformity of safety systems are referred to as “*assessment and registration bodies*,” “*certification bodies*,” “*certification/registration bodies*,” “*registration bodies*,” or “*registrars*.” in various countries. However, an increasingly comprehensive package of guidelines is being developed and issued through the ISO that apply to the various aspects of auditing and conformity assessment of HACCP and HACCP-based systems (see Figure 5.6 Representative listing of ISO guidelines in the area of conformity assessment and standards development).

The creation of methodologies which assess and monitor a HACCP-based in-establishment system is already leading to debates in State agri-food institutions concerning the future of government inspection services as currently provided by State governments. Whereas States have traditionally provided in-plant inspection services, the theoretical organization of conformity assessment mechanisms, as illustrated in Figure 5.7 (Generalized conformity assessment hierarchy among WTO Member Countries in accordance with the WTO Technical Barriers to Trade Agreement) (CFSAP 2002), suggests a significant shift in food safety activities. In this schemata, the role of State will shift from a service-provider to a service-facilitator, from a provider of inspection services to industry to providing the regulatory framework in which private sector servers provide auditing services to food establishments. The role of the *State government* is envisioned as being limited to establishing the national accreditation authorities or bodies through enabling legislation. The *Accreditation Body* will be empowered to accredit certifiers and personnel certifiers in accordance with international standards. The Accreditation Body also assumes the leadership role in securing Mutual Recognition Arrangements (MRAs) with their counterparts in other States through which the methodologies implemented by one State are recognized as equivalent to those in another State. Traditionally, such negotiations and agreements were then negotiated and signed by State officials.

Testing, Inspection, Certification and Certification/Registration Bodies would, in turn, be accredited by the Accreditation Body. Laboratory tests would be accredited to measure or calibrate samples or technologies or items, using internationally recognized scientific methods, to specific standards or requirements. Inspection bodies, accredited

under ISO Guide 17020, would examine individual products, services and processes to establish compliance with accepted standards or specifications. System certifying certification/registration bodies, accredited under ISO Guide 62, would certify organizations for compliance with quality management system standards (such as the ISO 9000 series) and/or environmental management systems (under ISO 14001) or food safety systems as these evolve. Product certification bodies, accredited under ISO Guide 65, would grant clients licences to label their products as complying with specific standards or specifications, based on test and inspection records (e.g., “ISO 9000 approved”). Finally, personnel certifiers, accredited under ISO Guide 17024, would certify the actual auditors who will be contracted or hired by food establishments to perform in-plant system audits in the place of government inspectors.

These conformity assessment bodies are envisioned to be both an integral part of a nation’s technical infrastructure, organized within a national standards system, and part of an international network of such bodies. Already such institutions have established international and regional groupings for co-operation, information exchange, harmonization of procedures and the establishment of Mutual Recognition Arrangements. These include, in addition to the ISO, the International Accreditation forum (IAF), the Pacific Accreditation Cooperation (PAC), the European Cooperation for Accreditation (EA) and the International Laboratory Accreditation Cooperation (ILAC).

Within this conformity/auditing framework, in-plant auditing of food safety can be undertaken in three manners: through first party, or internal, auditing conducted by the

establishment on itself; through second party, or supplier audits, through which an establishment conducts audits on a supplier or sub-contractor; and through third party, or external audit, conducted upon an establishment by an independent personnel or body.

- **ISO/IEC Guide 2:1996.** Standardization and related activities – General vocabulary
- **ISO-IEC Guide 7:1994.** Guidelines for drafting of standards suitable for use for conformity assessment
- **ISO/IEC Guide 22:1996.** General criteria for supplier's declarations of conformity
- **ISO/IEC Guide 23:1982.** Methods of indicating conformity with standards for third-party certification systems
- **ISO Guide 27:1983.** Guidelines for corrective action to be taken by a certification body in the event of misuse of its mark of conformity
- **ISO/IEC Guide 28:1982.** General rules for a model third-party certification system for products
- **ISO/IEC Guide 53:1988.** An approach to the utilization of a supplier's quality system in third party product certification
- **ISO/IEC Guide 58:1993.** Calibration and testing laboratory accreditation systems – General requirements for operation and recognition
- **ISO/IEC Guide 60:1994.** ISO/IEC Code of good practice for conformity assessment
- **ISO/IEC Guide 61:1996.** General requirements for assessment and accreditation of certification/registration bodies
- **ISO/IEC Guide 62:1996.** General requirements for bodies operating assessment and certification/registration of quality systems
- **ISO/IEC Guide 65:1996.** General requirements for bodies operating product certification systems
- **ISO/IEC TR 17010:1998.** General requirements for bodies providing accreditation of inspection bodies
- **ISO 6658:1985.** Sensory analysis – Methodology – General guidance
- **ISO 8586-1:1993.** Sensory analysis – General guidance for the selection, training and monitoring of assessors – Part 1: Selected assessors
- **ISO 8586-2:1993.** Sensory analysis – General guidance for the selection, training and monitoring of assessors – Part 2: Experts
- **ISO 9001:2000.** Quality management systems – Requirements
- **ISO 9004:2000.** Quality management systems – Guidelines for performance improvements
- **ISO 10005:1995.** Quality management – Guidelines for quality plans
- **ISO 10006:1997.** Quality management – Guidelines to quality in project management
- **ISO 10011-1:1990.** Guidelines for auditing quality systems – Part 1: Auditing
- **ISO 10011-2:1991.** Guidelines for auditing quality systems – Part 2: Qualification criteria for quality systems auditors
- **ISO 10011-3:1991.** Guidelines for auditing quality systems – Part 3: Management of audit programs
- **ISO 10013:1995.** Guidelines for developing quality manuals
- **ISO/TR 10014:1998.** Guidelines for managing the economics of quality
- **ISO/TR 10017:1998.** Guidance on statistical techniques for ISO 9001:1994.
- **ISO/IEC 17020:1998.** General criteria for the operation of various types of bodies performing inspection
- **ISO/IEC 17021:_____.** General requirements for bodies providing assessment and certification of management systems (in preparation)
- **ISO/IEC 17024:_____.** General requirements for bodies operating certification systems of persons (in preparation)
- **ISO/IEC 17025:1999.** General requirements for the competence of testing and calibration laboratories

Figure 5.6 Representative listing of ISO guidelines in the area of conformity assessment and standards development (CFSAP 2002).

Figure 5.7 Generalized conformity assessment hierarchy among WTO Member Countries in accordance with the WTO Technical Barriers to Trade Agreement (CFIA 2002).

Description	Audit Category	Conducted by	Self Description	Inspection	Testing	Auditing	Certification	Accreditation
FIRST PARTY	Internal	by an establishment on itself	✓	✓	✓	✓		
SECOND PARTY	Supplier	by an establishment on a supplier or sub-contractor		✓	✓	✓	✓	
THIRD PARTY	External	by an independent personnel or body		✓	✓	✓	✓	✓

Figure 5.8 The tools of conformity assessment and their inter-relationship with delivering parties (CFSAP 2002).

Exactly which approach is permitted depends upon the nature of the food product.

The higher-risk products, for example, would require third party auditing whereas lower-risk products, such as flour milling, might only require first party auditing. The

Option	HACCP standard	Form of Conformity Assessment	Description
1	None	None	No enhancement to current food safety regulatory practices.
2	Private/Industry standard – not formally recognized (<i>Voluntary compliance</i>)	None	Implementation of a HACCP or HACCP-based food safety system developed to local guidelines or with regional industry-based standard, but only internally recognized.
3		Self-declaration	As in option 2, but with supplier public declaration of HACCP system with no external assessment of conformance.
4		2 nd party supplier audit (non-accredited)	As in option 2, but HACCP system assessed by independent external supplier auditor who is not recognized by competent authority or accreditation body.
5		2 nd party supplier audit (accredited)	As in option 2, but HACCP system assessed by independent external supplier auditor who is recognized by competent authority or accreditation body.
6		3 rd party (personnel or certification/registration body) non-accredited	As in option 2, but HACCP system assessed by certification/registration body that is not recognized by competent authority or accreditation body.
7		3 rd party (personnel or certification/registration body) accredited	As in option 2, but HACCP system assessed by certification/registration body that is recognized by competent authority or accreditation body to a number of potential industry-based standards that are not recognized or equivalent.
8	Industry-based on National standard – recognized (<i>Voluntary or mandatory compliance</i>)	None	Enhancement of food safety system to a common standard recognized by a competent authority but with no declaration of conformity.
9		Self-declaration	As in option 8, but with supplier public declaration of HACCP system with no external assessment of conformity.
10		2 nd party supplier audit (non-accredited)	As in option 8, but HACCP system assessed against a recognized standard by an independent external auditor not recognized by competent authority or accreditation body.
11		2 nd party supplier audit (accredited)	As in option 8, but HACCP system assessed by an independent external auditor that is recognized by competent authority or accreditation body.
12		3 rd party (personnel or certification/registration body) non-accredited	As in option 8, but HACCP system assessed by independent external auditor that is not recognized by competent authority or accreditation body.
13		3 rd party (personnel or certification/registration body) accredited	As in option 8, but HACCP system assessed by independent external auditor that is recognized by competent authority or accreditation body.
14	Regulation	3 rd party (regulatory authority)	HACCP system assessed by regulatory authority.

Figure 5.9 Summary of conformity assessment options for HACCP or HACCP-based food safety systems (CFSAP 2002).

scope of conformity/assessment include self declaration, inspection, testing, auditing, certification and accreditation. How these relate to auditing approaches is summarized in Figure 5.8. Finally, each State can select from a series of options concerning conformity/ assessment for HACCP or HACCP-based food safety systems as summarized in Figure 5.9. The purpose of presenting these options is not to embark upon an examination of the potential options, but rather to illustrate the actual complexity of the emerging global agri-food regulatory framework and how it has extended itself beyond the bounds of States and into the private sector.

As was the case with the scientific discourse of Codex, the technical discourse of the ISO involves technical experts and not necessarily politicians. In the case of the ISO, there is a conscious effort to distance itself from politics although government officials are invited to participate when their input is seen as warranted (ISO 2002b). Consequently, although the nature of power in this technical discourse is again to be understood in terms of power within the organization and the power of the methodologies drafted and endorsed by the ISO, the actors engaged in the ISO are very different to those of the WTO. In terms of its membership, the ISO is made up of private sector national standards bodies and not governments, including: *full members*, being existing national standards bodies of States; *correspondence members*, being an organization in a State that does not, as yet, have a fully developed national standards structure; and *subscriber members*, consisting of representatives from less 'developed' countries who pay reduced membership fees (ISO 2002a). Therefore, the lengthening of the global regulatory framework is occurring beyond formal State structures and

international bodies into private sector institutions. In terms of the power of the methodologies developed by the ISO, although the full extent of this power can only be speculated upon at this time, it is significant that governments, including Canada, Australia and New Zealand, the member States of the European Union and the United States, are already redesigning their food safety programs based upon HACCP and ISO practices.

5.3 Power and the social/spatial organization of globalised agri-food

While Regulationists instruct us to study modes of regulation and the quest for social and economic stability within which regimes of accumulation under capitalism can operate, Foucault instructs us to consider the nature of power in the formation of social relations and spatial organization. That power, however, is contested. As discussed in chapter two, power represents, to recall the words of Clayton (2000b), an “incessant, decentred and malleable ‘force field’ of strategic relations among individuals, groups and institutions.” Power, therefore, is there for anyone, either as an individual or collectively as a group or institution, to seize and use. As was stated at the outset of this chapter, power is performed by individuals as consumers as well as by corporations, retailers, importers/exporters, processors, primary producers, and bureaucrats. To this list one can include scientists, technicians, economists, managers, technologists, trade negotiators, technical writers, inspectors and auditors.

Power, in the preceding discussion, has been associated with three distinct discourses: a political discourse organized around the WTO, a scientific discourse organized around Codex *alimentarius* and a technical discourse organized around the

ISO. Power in each of these instances has been seized by different actors: by politicians and their supporting cast of analysts, by scientists and by technical experts respectively. These sets of actors act upon the actions of each other, most often reinforcing the others, but each remains effectively independent of the others when it comes to their specific discourses. This independence is, in fact, emphasized by both *Codex alimentarius* and the ISO. *Codex alimentarius*, in addressing how it creates its expert committees declares that

“The membership of expert consultations is of critical importance. The credibility and acceptability of any conclusions and recommendations depend to a very large degree on the objectiveness, scientific skill and overall competence of the members who formulate them. For this reason, great care is taken in the selection of experts invited to participate. Those selected must be pre-eminent in their speciality, have the highest respect of their scientific peers, and be impartial and indisputably objective in their judgement. They are appointed in their own personal right - not as government representatives or as spokespeople for organizations - and their input is theirs alone. Some experts, especially those on continuing committees, remain members for long periods and thereby develop an invaluable institutional memory.” (Codex 2002c)

The ISO emphasizes ever greater independence as a private sector, transnational organization that operates at arms length from governments, again drawing upon private sector experts to design and review ISO standards.

The power operating within the WTO, the Codex and the ISO consists of two aspects: power operating within each centre’s institutional structure and power embodied within the regulations and standards formulated within these international institutions that impact on global agri-food. Any examination of power, in the first sense, raises questions of inclusion and exclusion. Which States have the resources to secure a dominant position in the WTO? Which States have the resources to become active Members of Codex and, further, have the resources to host a Codex committee?

Which national standards bodies are equipped to assume leadership in the design and development of technical standards and methodologies under the ISO? In some respects this borders on the nature of negotiations which is part of a regulation approach and any examination into how regulations come to be formulated.

Unlike Regulationists, however, Foucault would have us also examine the second aspect of power, the power in the regulations and standards which act upon the actions of people, groups, institutions, companies and even governments. A mode of regulations is not simply the framework within which globalised agri-food operates, but it acts upon those engaged in globalised agri-food. The simple examination of how regimes of regulations change in response to technological and economic changes in an effort to maintain a stability within the capitalist structure is inadequate when attempting to understand the nature of social relations and spatial organizations. Indeed, it would seem that there is no such thing as stability. It is necessary, instead, to consider more than structuralist explanations to reality. To Foucault, one must explore how power relations serve to shape social relations and spatial organization at a given time in a given place. It is necessary to consider how global institutions, not simply of governance but also of non-governmental organizations, influence social and spatial structures in terms of the power, how these global institutions enrol science and scientists and private sector actants, how power is harnessed and how it helps to create certain social and spatial forms.

Chapter 6. Understanding the Globalisation of Agri-Food through Actor-Network Theory

As suggested in the first part of this thesis, models necessarily simplify, and therefore abstract, reality. In any modelling exercise, a limited number of variables are selected, based upon their perceived relevancy to a given question, relegating the rest of reality to the sidelines. It has been suggested in chapter four that structuralist approaches to agriculture focus on economic relations as based upon the principles of capitalism. Both critical theory and regulatory theory extended this analysis to include institutional and regulatory structures as central to maintaining a stability within which capitalist modes of accumulation can operate. In chapter five, it was suggested that Foucault, on the other hand, focuses on the dynamics of power and how performed power defines knowledge and shapes both social and spatial forms.

Practitioners of Actor-Network Theory tend to engage the world differently. Instead of imposing a selected variable or set of variables upon reality, these practitioners first immerse themselves into the world and then identify those actants which make up specific networks through which social and spatial relations emerge. What might such an approach tell us about globalised agri-food? As was true for the previous chapter dealing with Foucault, the literature dealing with Actor-Network Theory and questions of agri-food is limited so this chapter will represent another sketch outlining what

To an increasing number of scholars, including Actor-Network theorists, the use of terms such as 'agri-food systems,' 'agri-food regimes' and even 'globalisation' is problematic. Whatmore and Thorne write that the term 'globalisation' "perpetuates a peculiarly modernist geographical imagination that casts globalisation as a colonization of surfaces which, like a spreading ink stain, progressively colours every spot on the map" (Whatmore and Thorne 1997:287). They continue, "one of the most serious consequences of orthodox accounts of globalisation ... has been the eradication of social agency and struggle from the compass of analysis by presenting global reach as a systemic and logical, rather than a partial and contested, process" (Whatmore and Thorne 1997:288). Terms such as 'global commodity systems,' 'agro-food regimes' and 'systems of provision' tend to impose a similar homogenous framework of analysis. Adoption of such frameworks tend to produce a structural approach which concentrates on capitalist relations through the food production, processing and marketing system from farm to retail sites and its supporting institutional/regulatory structures, thereby hiding, instead of revealing, the true heterogeneous nature of globalised agri-food.

Whatmore and Thorne also argue that neither TNCs nor regulatory bureaucracies provide an effective framework or means of understanding globalised agri-food. They conclude quite the opposite, writing that

"there is nothing 'global' about such corporations and bureaucracies in themselves, either in terms of their being disembedded from particular contexts and places or of their being in some sense comprehensive in scale and scope. Rather, their reach depends upon intricate interweavings of situated people, artifacts, codes and living things and the maintenance of particular tapestries of connection across the world." (Whatmore and Thorne 1997:288)

Furthermore, to refer back to Law, these are not reducible to a single logic or framework.

Actor-Network Theory is not driven by a desire to discover any underlying order to reality that can be distilled into some generalized model of globalised agri-food. Instead, it seeks out the difference and diversity that is part of reality, exploring this heterogeneity through the broad spectrum of actants – including economic, regulatory, social, cultural, and even philosophical actants – and the multiple sets of relations between these actants through which social and spatial relations are formed.

6.1 Immersed in a world of actants

At the conclusion of chapter three, a preliminary list of actants enrolled in globalised agri-food was compiled. This list consisted of: *people*, including farmers/producers, manufacturers of agricultural inputs, shippers, storage/warehouse managers, food processors, exporters, importers, distributors, retailers, foodservice personnel, government officials, veterinarians, researchers, marketers, and, of course, consumers; *corporations* of various sizes and organizational structure, from local to global in nature; *organizations*, including producer organizations ranging from sectoral organizations to supply management associations, and other sectoral organizations including those related to agricultural inputs, shipping/transportation, storage/warehousing, processing, export/import, distribution/wholesale/retail, foodservice, and consumer which exist at the sub-national, the national and the international scales; *governments* including national, sub-national (provincial or state), that can be further broken down into their various departments (departments of agriculture, health, the environment, and industry) and even further into their specific branches and their respective activities (research, marketing, inspection, etc.); *trans-*

national, quasi-political institutions, including regional trading blocks and global organizations such as the WTO; *policies, programs and agreements* initiated at the sub-national, national and international levels associated with the global agri-food complex; *technologies* associated with the various aspects of agri-food production, processing and marketing; *knowledge* related to aspects of research and development; and the myriad of *food products* themselves. In keeping with Foucault, each of these actants has the power to act upon the actions of the others.

It is possible to expand this list further. Actants, for example, include not simply the food products but the various ingredients of a food product. As discussed in chapter three, the creation of artificial sweeteners, such as fructose, replaced natural sweeteners, derived from sugar cane and sugar beets, in food processing. The introduction of new actants, as in this instance, produced new networks resulting in dramatic changes in social and spatial organization in those regions where sugar cane and sugar beets were grown as an export crop. This list of actants also includes the multitude of technologies used to produce, store, ship and process specific foods; the cultivars, feeds, machinery, biotechnologies, pests and biotics that can transform primary production systems; and, even the various pathogens and other hazards that can compromise food quality and safety.

In most inquiries, the human/non-human dichotomy is often assumed. We naturally privilege humans as the organising actors endowed with agency, thereby separating humanity from natural and technological systems which people are seen as creating, manipulating and controlling. Human actors, either individually or collectively, are seen

as the sole actors capable of constructing complex networks of non-human actants, be these other life forms, technologies and elements of the natural environment, into economic, social and technical structures.

However, while it is true that humans often do play a privileged role in Actor-Networks, non-human actants can, and do, impact on the actions of others, including people. This idea that non-human actants do influence the dynamics of a network is fundamental to Actor-Network Theory and is one way in which it is set apart from more traditional interpretations of systems and networks analysis. In Actor-Network Theory we are challenged to alter our understanding of social order to one that includes artifacts as active co-constituents of this order (Preda 2000). This implies that technological and “quasi-objects” (Callon 1986), other non-human life, the weather and other natural elements, and even ideas can all be actants which act upon the actions of other actants enrolled in the network, including people.

What does this mean to globalised agri-food? Consider, for example, primary food production. Is it the producer who organizes the various agricultural inputs into production schemes tailored to a specific crop or livestock product, or do the various inputs determine the set of possible actions available to a producer and thus organise that producer, or is it a combination of both? While a primary producer’s actions may not necessarily be totally determined by the other actants, that producer is not immune from the influence of these other actants either. As cited in chapter three, the seeds and associated production packages created during the “Green Revolution” effectively rewrote food production and the actions of producers in the Third World leading to

profound social and spatial changes (Yapa 1996). In this case, the producers were enrolled into already existing networks of production which included seeds, agricultural inputs and processes. Furthermore such 'turn-key' production strategies are taking root in industrialized State as well as agribusinesses developed new genetically-modified cultivars designed to be grown with specific packages of inputs also produced by the same company. An example of this is Monsanto's soyabean cultivars that can be grown with their herbicide Round-up®.

New technology, too, is continually altering primary production, food processing, storage and warehousing, transporting and retailing, even cooking practices. New machinery, new cultivars, new artificial insemination and breeding technology, and the emerging products of biotechnology are continuously leading to changes in primary production strategies at the farm level. New processing and packaging technologies, such as advances in modified atmosphere packaging, are not only extending shipping and shelf life for existing products, but are leading to the creation of new food products. Already cooking practices have undergone a dramatic revolution with the introduction of the microwave that, in turn, stimulated the creation of a wide range of new food products which companies aggressively market as part of the 'new lifestyle.'

The impact of these continually appearing new actants is not only felt locally, on specific farms or in specific processing establishments or in a specific retail outlet; their impact courses throughout the entire global agri-food network with social and spatial ramifications. For example, technological advances in slaughtering practices have accelerated today's line speed in a standard poultry processing plant in North America

to an average of 8,000 birds per hour, more than double that of the mid-1970s, when line speeds were governed by both manual evisceration and manual inspection (Henry and Rothwell 1995:40; Boyd and Watts 1999:214). One immediate outcome of automated slaughtering and de-feathering equipment has been the elimination of such jobs in poultry processing plants. However, the impact of such line speeds does not end with the plant and its employees. Line speeds have accelerated to the point where inspectors simply cannot keep pace, leading to difficulties in traditional inspection. This, in turn, has led to both the development of sensors that record the bacterial levels on the defeathered carcasses, effectively transferring a part of the inspector's duties from a human to a non-human actant, and it has forced governments to re-evaluate their inspection practices and methodologies, and the role of inspectors in overseeing the agri-food industry. The greater efficiency endowed to a single establishment through advances in technology is also leading to both the consolidation of poultry processing activities into fewer and fewer establishments and greater integration of primary production and processing to ensure that these establishments have a dependable supply of poultry (Boyd and Watts 1997). Flexible production techniques and multiple product lines further complicate this process and serve to reinforce the centralising tendencies of technology (Agriculture and Agri-Food Canada 1999; Agriculture and Agri-Food Canada and Statistics Canada. 2000).

To imagine a sector, such as agri-food, as composed of a myriad of networks consisting of ever-changing sets of actants is not an easy task. With Actor-Network Theory, it is a question of a researcher determining what is manageable. There is no

question that, as noted in chapter two, there is a great deal of subjectivity in Actor-Network Theory: what to include and what to omit, where to enter a network and where to end a network. Hence Law's description of Actor-Network studies as being stories rather than studies. As suggested in chapter three, most studies of agri-food, however, have focussed on specific sub-sectors or industries, such as the red meat sector, the dairy industry, the wheat industry, the poultry and egg industry, and the fresh fruit and vegetable industry. In so doing, however, these analyses often present simplified summaries of the structural features of a particular sector or industry, effectively overwriting the true heterogeneous nature of that sector or industry. This heterogeneity, furthermore, is not simply the product of a regionalism that promotes difference and variation in production and processing strategies; it includes differences between producers and processors regardless of their relative location. It includes differences in on-farm production practices between those producers, for example, who continue to apply commercial mono-cultural strategies and those producers who have adopted organic farming strategies. It includes different production practices by food manufacturers in terms of both differing sets of ingredients and differing processing methods in the design and production of their line of food products. It is this heterogeneity that is of interest to proponents of Actor-Network Theory. It is through the application of Law's story-telling that these various networks become visible.

6.2 Nourishing networks: stories of alterity

The most significant aspect of Actor-Network Theory is its ethnographic sensibility and the desire on the part of its proponents to reveal those alternate "forms of ordering"

(Heatherington 1997) which exist, not simply on the margins of society, but throughout society. Lorraine Thorne's 1997 doctoral study at the University of Bristol of the fair trade network for coffee represents an important study that draws upon Actor-Network Theory to expose alternate networks of food production, processing and trade (Whatmore and Thorne 1997). This work reveals two very exciting aspects of Actor-Network Theory. First, it demonstrates how differing networks and forms of ordering co-exist in both space and time with commercial networks. Second, it illustrates how an idea can act as the organising actant, or organising principle, of a network. Both of these aspects, I suggest, make Actor-Network Theory extremely relevant to most forms of academic inquiry including geography.

Concerning the co-existence of alternate networks, Whatmore and Thorne argue that

“alternative geographies of food are located in the political competence and social agency of individuals, institutions, and alliances, enacting a variety of partial knowledges and strategic interests through networks which simultaneously involve a ‘lengthening’ of spatial and institutional reach and a ‘strengthening of environmental and social embeddedness’.” (Whatmore and Thorne 1997:294)

They contend that alternative geographies exist alongside dominant corporate and state networks, occupying separate sites and establishing discrete lines of connection. As was the case with Law's “devices, documents and drilled people” in his study of the Portuguese spice trade, in this study, various actants become organized into a network of fair trade. This fair trade network has also succeeded in extending or lengthening itself through the enrollment of a diverse assortment of actants including those associated with alternative agricultural practices such as organic farming principles, alternative dietary philosophies and health criteria, as well as alternative technologies

and knowledges, along with a diverse set of human, institutional, non-human actants that are also enrolled in more mainstream, commercial networks of food production and trade (Whatmore and Thorne 1997).

Turning to the second aspect, it is clear that the organising principle of the fair trade coffee network is the principle of social justice. In this instance, the centrality of ethical relations, through the incorporation of social principles that includes issues associated with traditional agrarian political economy, translates the economic network and its enrolled actants. As such, Actor-Network Theory offers exciting possibilities to re-insert non-economic considerations, such as ethics, back into geography and into explorations of social relations.

How does this fair trade network succeed? Thorne's study focuses on one consortium called Cafédirect, a consortium that links four fair trade organizations in the United Kingdom (Equal Exchange, Oxfam Trading, Traidcraft plc, and Twin Trading), a Peruvian coffee exporting co-operative, and a series of small-scale farmer co-operatives in Costa Rica, Peru and Mexico where producers grow *Arabica* beans and in Tanzania and Uganda where producers grow *Robusta* beans. The network links this producer network with European-based roasters and retailers. Cafédirect's coffee was the second fairly traded product in the UK to receive the Fair Trademark, under criteria set out by the Fairtrade Foundation. Its first retailing contract was with Max Havelaar, a Dutch-based hybrid network of mainstream coffee roasters in 1990. Since then, this network has since grown to include retail outlets in the United Kingdom (including Asda, Budgens, Co-op, Europa, Morrisons, Safeway, Sainsbury's, Somerfield, Tesco, Waitrose, Booths, Fresh and Wild, Le Richie [Channel Islands], Planet Organic,

Proudfoot retail stores and Costa Coffee Shop) and continental Europe.

This network relies upon several mainstream actants which also are enrolled in commercial networks, including conventional global wholesaling, retailing and financing networks that facilitate the marketing and financial aspects of the trade. Pricing, for example, is still determined through the Cocoa, Sugar and Coffee Exchange (CSCE) in New York. However, this price is modified through fair trade agreements wherein producers are guaranteed a minimum price from buyers, regardless of the commercial price of coffee, and a premium under specific conditions. In this manner, producers are protected from depressed market prices and when coffee prices do rise above this base price, buyers pay that plus a ten percent premium. This additional revenue goes to the producer co-operatives for infrastructure development and social services. A second set of commercial actants, principally banks, collectively form the international financial system through which Cafédirect pays the Peruvian exporting co-operative, CECOOAC-Nor. Other mainstream actants include government officials such as customs officials, telecommunications facilities, and ships, shipping agents and port authorities (Whatmore and Thorne 1997).

The mode of ordering of the network, or its connectivity, is understood as being organized around the principle of “fairness,” as opposed to what Whatmore and Thorne describe as “the cost-minimizing, self-interested individual of neoclassical economic theory” (Whatmore and Thorne 1997:298) (see Figure 6.1 Network ‘strengthening’: fair trade and commercial coffee networks exhibit distinctive ‘modes of ordering’). This connectivity of fairness is expressed as a balance between producer and consumer

needs. It is

“a mode of ordering [that] establishes the performance of ‘fairness’, rather than charity, in which the farmer gets a ‘fair price’ and the consumer ‘gets excellent coffee’. In order to strengthen the network, fair trade organizations must make concrete the telling and performing of connectivity and fairness in the hybrid network.” (Whatmore and Thorne 1997:298-299)

Figure 6.1 Network ‘strengthening’: fair trade and commercial coffee networks exhibit distinctive ‘modes of ordering’ (Whatmore and Thorne 1997:300)

This principle is further incorporated into the marketing strategies of Cafédirect. Label claims make this discourse of connectivity not only explicit and visible to the consumer but also, in an important sense, personal insofar as the text seeks to secure the consumer's ongoing enrollment in this network through a declaration of fairness:

“This is a fair trade product. More of the money you pay for Cafédirect freeze-dried goes directly to the small-scale coffee farmers in Latin America and Africa. Fair trade means coffee growing communities can afford to invest in healthcare, education and agriculture.” (Cafédirect in Whatmore and Thorne 1997:298)

However, this network is also fraught with tensions, raising the question of its durability. As Whatmore and Thorne (1997:299) observe, “at each point in the hybrid network there is instability and uncertainty, so that strengthening the embeddedness of the co-operatives is as important to the fair trade network as strengthening consumer support for fair trade coffee through marketing strategies and educational campaigns.” This underscores the importance of coffee quality, long term commitments and reliability of delivery, access to markets, and consumer loyalty to the network's survival. If any of these aspects were to be compromised, it could easily lead to the fracturing of the network. It is interesting to note that the mainstream commercial networks, organized around corporations, share these same concerns. Both networks, in effect, share the same economic language. In the case of the fair trade networks, an ethical principle has been incorporated into the economic formulations.

Part of this tension is the result of scale. As was discussed earlier in chapter two, the stability of a network rests, in part, upon its size. The number of actants recruited into the fair trade network is significantly fewer than those captured by commercial networks. In 2000, Cafédirect share of the global coffee trade was approximately one

half of one percent, handling approximately 500,000 bags of coffee out of a global trade amounting to 90 million bags of coffee (Cafédirect 2002). Market share and visibility are significantly less for fair trade coffee, further increasing its fragility.

As noted earlier, one strategy adopted by fair trade networks in its efforts to lengthen itself is through the seeking of alliances with other, symbiotic networks. In the case of fair trade agricultural products this has involved associating itself with a second powerful discourse – that of environmentalism – through crucial links with proponents of organic farming and natural food processing methods. One outcome of this association has been the certifying of six of the participating co-operatives as organic by the Organic Crop Improvement Association (OCIA International).

It is also instructive how this alternate network traverses scales, enrolling actants globally. Thorne breaks down the actants engaged in the fair trade coffee network spatially as follows (see Figure 6.2 Network ‘lengthening’: coincident spaces of a fair trade and commercial coffee network): in North America these include the CSCE, the U.S. banking institutions and the Organic Certifying Organization; in Latin America, the Reuters Commodity Service, Peruvian Banking Institutions, national Customs and Excise institutions and officials, national Ministries of Agriculture in the various coffee producing nations, shipping agents, ships and port authorities, and organic certification bodies; and in the United Kingdom, the London Commodity Exchange, U.K. Banking Institutions, British Customs and Excise institutions and officials, shipping agents and port authorities, the Organic Certifying Organization, private sector roasters and packers, and the UK retail market. The network is also inter-linked through

Figure 6.2 Network 'lengthening': coincident spaces of a fair trade and commercial coffee network (Whatmore and Thorne 1997:298)

telecommunication facilities located in all three continents. Finally, this network must also be seen as consisting of people; in fact, this is the crucial point, for the principle of fairness, and the subsequent ethical engagement with others, is the organising principle of the network. This spatial organization illustrates how Actor-Network Theory overcomes questions of scale. Networks incorporate actants at the local, regional and global scales.

6.3 Globalised agri-food regulation as a network

However, Actor-Network Theory offers more than the recounting of stories of alterity, notwithstanding the importance of these stories. With its ethnographic sensibility, researchers are encouraged to pay greater attention to the actants themselves. As already suggested at the outset of this chapter, globalised agri-food is populated by a myriad of actants which are enrolled in a myriad of networks. None of these actants are stable, being acted upon by other actants in the network, nor are these networks fixed. Turning to the institutional framework, as Whatmore and Thorne observed in their critique of the term ‘globalisation,’ governments themselves are nothing more than complex “interweavings of situated people, artifacts, codes and living things.” The same can be said of the global agri-food regulatory framework. What is of interest to Actor-Network theorists is how these networks radiate outwards from the three centres of international governance to enrol actants located in regional and State structures, in scientific institutions and in private sector institutions.

However, through its heightened sensitivity towards the actants themselves, Actor-Network Theory can also provide an ‘early-warning system’ through which it is

possible to identify specific actants or sets of actants as these assume greater importance in networks. Globalised agri-food provides an excellent example of this ability.

Traditionally, trade has been principally governed or organized through agreements between States and managed through a combination of tariffs that restrict access to a State's domestic marketplace and export support programs that assist that State's agri-food exporters. Supporting these economic actants have been selective food safety and environmental regulations restricting the movement of specific agri-food products from specific States for specific reasons (valid or otherwise).

However, with the trend towards "freer" trade, as understood as consisting principally of the reduction and elimination of tariffs and export support programs, these agreements and economic actants are becoming less important. The elimination of tariff and export support programs, as prescribed by the WTO, will minimize the relative importance of these economic actants as trade disputes away from economic hindrances to trade to non-economic barriers. As economic-based actants become less important, other actants are emerging as being increasingly important in the formation of networks in globalised agri-food. In a reversal of importance, these actants are scientific actants and, more precisely, these actants are the pathogens themselves.

The identification of pathogens as actants of importance in agri-food networks brings the present discussion back to that concerning the social construction of knowledge raised at the outset of this thesis and to Latour's studies of Louis Pasteur. Latour, in seeking to account for the power of science in today's world, drew upon Pasteur and his work on both yeast (Latour 1988) and anthrax bacillus (Latour 1983)

during the mid- to late-nineteenth century. In both these studies, Latour highlights how non-human life-forms, invisible to the eye, successfully became visible and changed the way the world was seen and organized.

The remainder of this discussion will focus on his account of Pasteur and anthrax, a contagious disease of sheep and cattle which is transmittable to humans. Latour takes us back to 1881 and Pasteur's work at the *École Normale Supérieure* in Paris. At that time, Pasteur was already renowned in Paris for his work in the mid-nineteenth century on lactic acid fermentation, his 'discovery' of yeast and its subsequent recognition as a "full blown entity in its own right" (Latour 1999b:116). Latour raises two questions: how was Pasteur able to secure the interest and necessary support of French society for his work on anthrax, and more generally, how do scientists conjure up not only nature but also society (Latour 1983).

Concerning the first question, Latour examines how Pasteur was able to enrol members of French society into his network, adopting the same method as he had twenty five years earlier during his experiments on yeast; "he transfers himself and his laboratory into the midst of a world untouched by laboratory science" (Latour 1983:144), in this instance, into the world of anthrax. This involved establishing a make-shift laboratory on a farm in the French countryside where Pasteur studied anthrax bacillus as it operated in the field. Once satisfied that he had sufficient information on anthrax, Pasteur then transported the field back to his laboratory at the *École Normale Supérieure* bringing with him the bacillus. There, he conducted a series of experiments on the anthrax by which he began to successfully manipulate it. In so doing, Pasteur

became the “master of one technique of farming no farmer knows, microbe farming” and this was “enough to do what no farmer could ever have done: grow the bacillus in isolation and in such a large quantity that, although invisible, it becomes visible” (Latour 1983:146). Once made visible in the laboratory, the bacillus came into existence as an actant.

Yet Pasteur’s work with anthrax does not end with its transformation into an actant; now came the quest to subdue the bacillus. Through his actions, Pasteur successfully shifted the focus of anthrax away from French farms to his laboratory. He subsequently developed a vaccine and tested it, with success, in his laboratory. It then came time to insert the vaccine into the French countryside. However, this involved more than simply distributing the vaccine to farmers. First, Pasteur had to extend his laboratory and his laboratory practices back into the world so as to create the conditions under which the vaccine would be successful. This effectively required what Latour termed a second translation since “the vaccination [could] only work on the condition that the farm chosen in the village of Pouilly le Fort for the field trial be in some crucial respects transformed according to the prescriptions of Pasteur’s laboratory” (Latour 1983:151-152). This included the adoption of a set of practices including disinfection, cleanliness, conservation, timing, and proper record keeping. Once these requirements were agreed to and applied by the farmer, the trial went ahead with success resulting in one final triumphant translation – the linking of the problem (the anthrax bacillus) and the solution (the vaccine) with science (the laboratory) . Again, as Latour (1983:152) writes, this enabled Pasteur to effectively declare

“‘If you want to save your animals from anthrax, order a vaccine flask from Pasteur’s laboratory, *École Normale Supérieure*, rue d’Ulm, Paris.’ In other words, on the condition that you respect a limited set of laboratory practices... you can extend to every French farm a laboratory product made at Pasteur’s lab.”

The outcome of Pasteur’s work was twofold in terms of knowledge. First, the French countryside changed fundamentally as a result of Pasteur with the emergence of not one but two new actants – the anthrax bacillus and the vaccine with which farmers could battle it. The impact of his work was twofold. First, through the series of three translations, Pasteur successfully extended scientific networks beyond the confines of the laboratory that both allowed for the circulation of his facts and artifacts and effectively transformed the French farm. As a result, science and reality merge in a sense insofar as “no one can say where the laboratory is and where society is” (Latour 1983:154). Through the series of translations, French farms were ultimately transformed to replicate the basic conditions of Pasteur’s laboratory so as to assure the necessary conditions were created under which the vaccine could work.

Second, society was remade to include space for both the microbes and a remade Pasteur. The microbe became part of the world and, through his success, Pasteur accrued power. As Latour writes,

“Who can imagine being the representative of a crowd of invisible, dangerous forces able to strike anywhere and to make a shambles of the present state of society, forces by which he is by definition the only credible interpreter and which only he can control? Everywhere Pasteurian laboratories were established as the only agency able to kill the dangerous actors that were until then perverting efforts to make beer, vinegar, to perform surgery, to give birth, to milk a cow, to keep a regime healthy and so on.” (Latour 1983:158)

The power of science and the scientist, as illustrated by Pasteur, is derived not only from the knowledge and the power of the scientific discourse in modern society, but

also from the ability of the scientist to act at a distance. This ability is reflected in two manners. First, there is the acceptance and adoption of the knowledge being disseminated. In his efforts to demonstrate how laboratories gain power in the modern world, Johnathan Murdoch (1997) observes that Latour

“shows that this power emanates from their ability to tie together actors situated beyond the laboratory into networks that are established to disseminate scientific facts and artifacts. Latour thus builds upon the laboratory studies, taking them beyond the microlocale and the scientific realm, to the transformations that are wrought by science on the world at large.” (Murdoch 1997:737)

This ability to transcend scale has already been cited as a vital aspect of Actor-Network Theory in Law’s study of the Portuguese spice trade. What makes science such an effective source of power, therefore, is the multiple networks through which scientific knowledge flow.

Second, there is the associated translation of other actants that make up the network. The magnitude of that power is reflected in how this knowledge has succeeded in standardizing and channelling the behaviour of other actants in “the direction desired by the enrolling actant” (Murdoch 1995:747). In this instance, the direction is determined by the science of the pathogens. As in the case of Pasteur and anthrax, Murdoch (1997:736) concludes that because of this power “one microlocale – the laboratory – can send its facts and artifacts out into the world as long as other microlocales – farms – are first modified to accommodate the scientific products. The extension of these conditions is a function of scientific networks through which scientists gain the ability to act at a distance.”

This ability is crucial when one considers modern food safety strategies. The ability to transfer knowledge from one form of microlocale, the laboratory, and insert it into a second microlocal, a processing establishment, farm or other site in the agri-food complex is fundamental to globalised agri-food and lies at the heart of HACCP methodologies. As noted in the discussion concerning Foucault, the scientific discourse of Codex considers not simply the parameters of food safety – the actual amounts of biological, chemical and physical contaminations considered to be safe for specific foods – but, more importantly, the establishment of a universal food safety management system, HACCP, that is achieving its own hegemonic status globally. This ability to act at a distance is further supported by the lengthening of the food safety network through the third centre, the ISO, through its technical discourse.

The flexibility inherent in HACCP methodology is an essential means through which food safety strategies are organized and extended within a network that is extending itself to include all sites associated with food production, from primary production to retailing and the foodservice sector with the laboratory. Because of the food safety network's vitality, the crucial association between pathogens-laboratory-world is perhaps more powerful today as it applies to modern food safety systems, now extending to an interconnected global network of scientific institutions, research stations and laboratories, and being organized around, not one, but several pathogens including such microbes as *Salmonella* sp., *E. coli* sp., *Campylobacter* sp., *Yersinia enterocolitica*, *Listeria monocytogenes*, and *Clostridium perfringens*.

Latour (1983:158) is quite right in writing that “microbiology laboratories are one of the few places where the very composition of the social context has been metamorphosed.” This is as valid today as was during the times of Pasteur. Today’s approach to food safety is to manage dangerous pathogens, and other potential contaminants, throughout the food production, processing and distribution system. Advances in food safety, including new scientific knowledge concerning pathogens, new food safety technology and new safety practices, all of which are created in some research laboratory can now be disseminated through extensive networks which ultimately link the entire agri-food complex globally. However, to ensure the success of this knowledge, each farm and processing establishment, each truck/train car/ship/plane, each warehouse and storage, each retail outlet and each foodservice outlet, must first be transformed in some fashion to create the appropriate environment in which the food safety practices as developed in laboratories will succeed. Hence the existence of pre-requisite programs covering premises, transportation and storage activities, equipment, personnel, sanitation and pest control, and recalls. It is these programs that the essential setting in which scientific food safety practices will succeed is created.

6.4 Pathogens, HACCP and the end of State authority?

Can the preceding application of Actor-Network Theory be used to speculate about the future of globalised agri-food? In effect, can Actor-Network Theory be predictive? Already, as Canadian officials have acknowledged, “the new world order of science-based trade decisions under the WTO means that state-of-the-art food safety systems must be based on verified implementation of the state-of-the-art science which can be

defended by our governments in that international arena” (CFIA 2000a). This “new world order” is leading to fundamental changes in agri-food production, processing and retailing at all scales. As food safety and quality standards have become intertwined with trade liberalization efforts, their purpose has changed fundamentally. The formulation and harmonization of sanitary and phytosanitary measures are no longer concerns of nations, but have become international issues of contest and intrigue. National standards are increasingly being overridden by international standards as these define the rules of global trade. The SPS Agreement encourages governments to harmonize their national measures with international standards, guidelines and recommendations. The TBT also places emphasis on international standards by requiring that WTO signatories use international standards or parts of them except where the international standard would be ineffective or inappropriate in the national situation. Therefore, it would seem that it is possible to speculate upon the nature of the network of globalised agri-food.

With the ascendancy of pathogens as a primary set of actants in globalised agri-food, the network has changed with some existing actants becoming more powerful, other new actants being enrolled and yet others becoming less important or withdrawing entirely. State actants serve as an example of the last set of actants, or those becoming less important or withdrawing entirely. One is, in fact, forced to ask whether there is still a role for States in globalised agri-food. If there is a global consensus concerning the application of HACCP and HACCP-based food safety systems, along with general agreement on the processes and science embodied in HACCP, as organized around standards set by Codex, and if there is a global consensus concerning the methods by

which HACCP systems are approved against established global criteria as set by the ISO and audited also against established global norms, then what role is left for State governments beyond creating the enabling legislation for standards institutions to operate as noted in the previous chapter? If every State's agri-food sector was organized around the same standards and methodologies, as set by international institutions, there is in fact little need for a State to be involved in the management of the agri-food sector. In such a world, a food product manufactured in India under an approved HACCP program supported by an approved auditing system, would in theory be as safe as a food product manufactured in Canada, the United States or the European Union.

This possible "new world order" is already leading to fundamental debates concerning the nature of governmental organization and its regulatory philosophy. Increasingly, regulatory responsibilities associated with quality and safety standards are being shifted from governments to the private sector, and governmental structures are being redefined to manage this new regulatory order. In Canada, agri-food inspection services have been consolidated into a separate food agency, the Canadian Food Inspection Agency. A principal objective of CFIA since its inception in 1995 has been the creation of more TQM inspection services. This has since been expanded to develop HACCP and HACCP-based programs which extend from on-farm safety management systems to HACCP-based systems in the retailing and foodservice industries. New Zealand and Australia have gone even further by establishing a single food authority, the Australian New Zealand Food Authority (ANZFA), to develop standards and systems for food safety, which includes mandatory HACCP adoption in the processing sector, for the two countries. In its *White Paper on Food Safety*, released in early 2000, the European Union reaffirmed its commitment to a comprehensive, integrated science-based approach to food safety and proposes establishment of a European Food

Authority, setting a target of January, 2004 to design and implement a set of measures also outlined in the White Paper. These regulations outline the “rules to ensure the hygiene of foodstuffs at all stages from, and including, primary production up to offering product for sale or the supply of a food stuff to the final consumer” (European Union 2000).

In such a world, the movement of agri-food products would be facilitated through such immutable mobiles as HACCP certification documentation. There would be, in theory, no reason for government inspection or verification, or for border surveillance of the agri-food trade. It is interesting to note that the implementation of HACCP is already being used as a weapon in the global marketplace. In 1996, the United States introduced legislation requiring all imported meats and meat products to be produced under HACCP safety systems even though its own domestic industry would not be in “HACCP compliance” before 2000. As already noted, Japanese importers, who are now liable by law for the safety of the foods they import, are establishing criteria for processor level HACCP programs and demanding the creation of on-farm quality assurance programs from global suppliers (CFIA 2000a). Demands by consuming countries are, as Marsden suggests, being imposed on producing States thereby creating “different mosaics of regional production and consumption space [where] the themes of quality, regulation and consumption operate as active concepts in creating and maintaining food networks” (Marsden 1997:188).

It should also be noted that there remain important questions concerning the nature of this new global agri-food regime. Confronted by this momentum towards globalised safety standards, it is important to ask *whose* standards are to be applied nationally and internationally? Food safety standards have become the domain of a global scientific *episteme*. Seen from the perspective of safety, it is difficult to contest the

appropriateness of these approaches. The objective, systematic identification of potential biological, chemical and physical hazards throughout food production, processing and retailing networks and the means for managing these hazards leaves little space for alternates to this science. It all seems so rational. However, as Sheila Jasanoff observed, “scientific knowledge, according to a growing body of work, is a social construct in the sense that it is contingent on human interactions and susceptible to the multiple influences of economics, ideology, culture and political interests” (Jasanoff 1996:175). The question, therefore, becomes whose science is privileged? Whose hazard description, critical limits of the hazard, monitoring procedures, deviation procedures and verification procedures are to be adopted? Furthermore there is the question of what, and whose, technology is to be certified and integrated into this scientific organization. While the idea of scientific food safety strategies may seem benign, it is clearly not, as the science of food is politically charged and driven.

6.5 What Actor-Network Theory can do

When confronted by questions of social injustice in social and spatial relations, one might ask whether there are other forms of ordering through which justice might be realized. Actor-Network Theorists argue that such alternative forms of ordering do, in fact, exist in networks of alterity.

Proponents of Actor-Network are sceptical of such terms of ‘globalisation,’ ‘agri-food systems’ and ‘agri-food regimes’ with good reason. Such constructs are seen as nurturing homogenizing understandings of the processes inherent in globalised agri-food that, as Whatmore and Thorne observed, has resulted in the “eradication of social agency and struggle from the compass of analysis by presenting global reach as a systemic and logical, rather than a partial and contested, process” (Whatmore and Thorne 1997:288). In the place of such approaches, Actor-Network Theory instructs us

to broaden a field of study ethnographically and to delve into networks of alterity.

In so doing, a different understanding of globalised agri-food emerges, an understanding that emphasizes heterogeneity, the multitude of actants and the existence of a myriad of networks. Within this heterogeneity, Whatmore and Thorne reveal the existence of alternate networks organized around differing principles to those that organize commercial networks. In the case of fair trade coffee, the organising actant is the ethical principle of fairness.

However, Actor-Network Theory offers more than recounting stories of alterity. Because of its ethnographic sensibility, it fosters greater sensitivity to the nature of the actants themselves. By immersing one's self into a world populated by a multitude of actants, without assigning these actants any sense of relative importance prior to this exploration or archaeology, it is possible to discover relations which might otherwise have been overlooked. This is the focus of the discussion on pathogens as the organising set of actants of the emerging science-based global food safety regime. Having raised this, it then became possible to speculate about the future organization of global agri-food and its regulation. It was thus argued that this new set of organising actants was effectively transforming the networks that constitute the global food safety regime. With this transformation, certain actants were seen as gaining power, specifically actants within the scientific networks, while other actants were losing power, specifically within the economic networks. Also, with this transformation, new actants were successfully being enrolled into the network while other actants were withdrawing from the food safety network. This last process involves the shifting of food safety activities from governments to private sector organizations, suggesting a fundamental shift in the current understanding of sovereignty.

Differing Visions of Globalised Agri-Food: Closing Thoughts to Part II

What understanding of globalised agri-food has been derived from these three approaches? With Regulation Theory, the emerging international set of institutions was seen as perpetuating a structural interpretation of globalised agri-food that included an orthodox approach to geopolitics founded upon the sovereignty of States. The purpose of international negotiations and resulting agreements and associated regulations is to create a stable socio-economic framework in which the forces of capitalism can operate. Regulationists therefore study the evolution of modes of regulation within which regimes of accumulation can operate, focussing on how these modes change as a result of restructuring crises brought on by changes in technology and production strategies. The regulations themselves simply provide the framework. With Foucault, the focus of inquiry shifted to the distinct forms of power associated with the specific discourses of the emerging set of international institutions and how these institutions and their regulations act upon the actions of the others which constitute globalised agri-food. In this inquiry, the power that operates through regulations is given greater importance. Finally, with Actor-Network Theory, the focus of inquiry shifted towards exploring the myriad of networks operating in a heterogeneous world and, ultimately, to the actants themselves and how these are redefining such networks. In this approach, the emerging international regulatory framework is seen as increasingly being defined by pathogens

and the science of pathogens that, in turn, is affecting the distribution of power in the network and is transforming the international regulations associated with globalised agri-food. Each approach, thus, offers unique and valuable insights through which a more comprehensive understanding of globalised agri-food can be achieved.

Regulationists extend the scope of structural analysis and Marxist critical social theory to a consideration of the rules and regulations, both formal and informal, operating within a capitalist society through which social stability is achieved. They consider how social and institutional “ensembles” seek to achieve stability through which a particular regime of accumulation is maintained, and how specific “modes of regulation” mediate, normalize and ultimately regulate social relations within a specific capitalist regime. These social structures are not, however, fixed or permanent. As Perez noted, new techno-economic paradigms emerge, the existing socio-institutional framework comes under pressure and ultimately is refashioned to meet the nature of the new techno-economic organization. These evolve through processes of negotiation and consensus-building (although there remains the rather thorny issue of whose voices are considered in these processes). Instability occurs when the socio-institutional framework can no longer contain the techno-economic organization. Society seeks to regain that stability through new socio-institutional organization that is capable of containing the new dynamics resulting from new technologies, new knowledges (particularly scientific), and new economic relations.

In a Regulationist examination of globalised agri-food the people, corporations, organizations, technologies, knowledges, and agri-food products themselves are

understood to operate within the framework established by governments and trans-national, quasi-political institutions and their policies, programs and agreements. Focussing specifically on Le Heron's globalisation perspective, we see what is essentially an analysis conducted at the macro-level. He concentrates on organizations and institutions and not individuals, be they producers or corporations. His analysis privileges the global capitalist accumulation process, the dynamics of capitalist forces and the regulatory arrangements. The individuals either acting as individuals or collectively, corporations, technologies and food products all operate within the regulatory framework.

While Regulation Theory focuses on the formation of the mode of regulation that promotes stability in which capitalism can operate, this mode of regulation is not restricted to the macro-level but includes social and institutional ensembles consisting of both sets of formal and informal rules and regulations of a society, thereby forming regulatory networks. So Regulationists do acknowledge the reach of regulation across scales as well as between sites. Le Heron, in his globalisation perspective, also acknowledges regulatory organizations themselves as actors within a composite of actors and not benign sites where actors negotiate and reach consensus. Finally, he also suggests the possible existence of alternate networks of relationships, a possibility that to Foucaultians and proponents of Actor-Network Theory take as a given.

The idea of an agro-commodity chain or an agro-commodity system or a food production chain is also not to be understood as a stable set of relations. To the contrary, Regulationists acknowledge that there always exists the possibility of discontinuities

in production and consumption, that change is always occurring. However, Le Heron writes that

“The agro-commodity chain idea serves as a meso-category which is useful firstly, when viewing the early incorporation of bio-physical processes into food and fibre production, whether or not such production was mainly for the domestic market or principally for export and secondly, where initially simple production sequences have been elaborated into globalized production complexes.” (Le Heron 1994:48)

To “deconstruct” such chains Le Heron writes that one requires: a knowledge of the key organizations in the different industries and across industries thus entering the realm of the power relations which bind such organizations of the chains together; a knowledge of how the ‘structural coherence’ of the agri-systems is created and maintained, through the relative power exercised by different interests seeking to influence change; and finally, a knowledge of the “integrative and fragmentary influences manifest in contemporary agro-commodity systems, are at present differentiating segments of the agricultural labour process” (Le Heron 1994:49).

Turning to the regulatory framework of globalised agri-food, Le Heron introduces the idea of nesting as representing the enrollment of smaller sites of regulation into larger, global sites and in so doing he introduces both Foucaultian power and Actor-Network into his analysis:

“a ‘global’ regulatory strategy involves subordinating and organizing a number of smaller sites of regulation (social forms, structural forms) within its orbit. A global strategy is intended to structure the possible field and scope of actions to smaller sites, but these sites have an independent existence and can be sites of resistance to the global strategy.” (Le Heron 1994:66)

Networks become organized around principles, norms, rules and decision-making procedures within which consensus between actors can be achieved. This necessarily

raises the question of power, both in terms of who determines the principles, norms, rules and decision-making procedures and who is represented at the negotiations.

If this is all true, however, how can one speak of stability? Le Heron (1994:69) writes that “a stable mode of regulation thus has: some measure of unity or consensus [between actors] about the main projects, strategic selectivity, distinctive mechanisms and clear regulatory subjects.” The stability, therefore, does not seem to lie in the processes inherent in capitalism; rather, it would seem that the stability is sought and achieved in the framework of regulation itself that is based upon the existing techno-scientific nature of the society and a consensus concerning the appropriateness of that framework. A Regulationalist analysis seemingly, therefore, reveals how hegemonic structures emerge in a society, returning the discussion to Gramsci’s ideological hegemony.

Foucault would have us look at the power operating within and through globalised agri-food. For a Regulationalist this might mean asking the question, who, for example, has the power to be seen as a key organization or sector in Le Heron’s analysis. However, power to Foucault is far more than that. In the case of globalised agri-food and specifically its institutional setting, the Foucaultian analysis raised the notion of power in two essential forms: first, the power within the emerging international institutions of governance, and second, the power of the regulations created in these institutions that in turn act upon the actions of those who constitute the globalised food, from primary producers right through to consumers. The examination of power, in the first sense raises questions of inclusion and exclusion. The examination of power in the

second sense raises questions of dominance and subjugation.

This power radiates outwards through networks of relations and of experts. As an example, the scientific network of Codex *alimenarius* has continued to extend, or lengthen, in the form of collaborative studies between individual scientists, laboratories, institutes and universities and joint FAO/WHO expert committees and consultations. Given the scope of Committees and specialization of the knowledge, Codex has lengthened itself through a vast global network of laboratories, scientific research centres, universities, even governmental institutions, to manufacture knowledge in a manner similar to what Latour and Woolgar described more than twenty years ago in *Laboratory Studies*. Finally, just as Codex draws upon its community of experts, so too does the ISO, relying on experts principally from the private sector to develop and evaluate managerial methodologies and standards. Power is extracted from this network, and the knowledge transported through this network assumes power as reflected in how it comes to act upon the action of those engaged in globalised agri-food and how this knowledge defines the set of possibilities open to these actors.

Finally, Actor-Network Theory has been applied in two different manners to the question of globalised agri-food. First, it serves as a means of exposing alternative networks, based upon alternative organising principles, of agri-food production, processing and retailing that already exist. Second, it serves as a tool for exploring the transformations of specific actants within networks over time. Through Actor-Network Theory there appears a different globalised agri-food than that seen through Regulation Theory. The people, corporations, organizations, technologies, knowledges, and agri-

food products themselves do not simply exist within the framework established by governments and transnational, quasi-political institutions and their policies, programs and agreements; they impact upon these institutions and policies, programs and agreements as well. In this world, the framework is directly affected by its actants.

Thorne's work on the existence and perseverance of a fair trade network such as Cafédirect illustrates several exciting aspects of Actor-Network Theory which were not considered in chapter two. First, there is the recognition that alternate networks exist alongside the dominant networks. In this case, alternate agri-food networks are revealed as operating alongside dominant agri-business structures. The idea of a core and margins is thus discarded and the spaces for alterity are understood as existing throughout a society and not merely on its 'margins.' Second, this study clearly illustrates how Actor-Network Theory crosses spatial scales. As Thrift observed, "where the concepts 'local' and 'global' work well for surfaces and geometry, they mean little for networks and topology" (Thrift 1999:290). This is certainly true in this study by Whatmore and Thorne. Third, whereas in his study of the Portuguese spice trade Law utilizes Actor-Network Theory to address questions of history and historical analysis, in their study of fair trade networks, Whatmore and Thorne illustrate how Actor-Network Theory can be used to reveal the myriad of complex networks at work simultaneously today. Fourth, and perhaps most importantly, is the idea that different actants can serve as organising actants or principles for a network. In this case, it is the idea of fairness. In effect, an ethical actant is organising the network. In so doing, Actor-Network Theory thus permits the re-engagement of questions of ethics and morality by geographers,

sociologists and even scientists. This study illustrates how alternate networks can lead to alternate social structures and alternate spatial expressions. Furthermore, it illustrates how one alternative network can lengthen itself through alliances with other symbiotic networks including small-scale farming and organic farming techniques.

Turning to the second application of Actor-Network Theory, its ethnographic sensibility encourages one to explore the myriad of actants without presupposing any causal relationships or assigning relative importance to various actants that would privilege one actant or set of actants. In so doing, it is possible to identify shifts in power within a network from one actant to another. In this case, the economic actants which were seen to be the crucial actants of global trade are becoming less important or powerful as the Marrakesh Agreement and its goal of eliminating tariffs is implemented. At the same time, scientific actants, and specifically the pathogens and the science of those pathogens which pose a danger to food safety, are gaining in power as globalised agri-food shifts towards a global agri-food regime organized around the principle of safety. This enhanced power comes not only from the scientific networks that link scientific institutions globally but also from the lengthening of this network to include technical networks through the ISO. Finally, it is possible to speculate about the future of globalised agri-food. In this particular examination it has been suggested that the ascendancy of pathogens in globalised agri-food could potentially lead to the withdrawal of many government actants from the food safety network and their replacement with a new set of actants originating from the private sector.

Separately, each of these understandings of globalised agri-food have value whether as a means of exploring the existing hegemonic structures of modern society and Gramsci's ideological hegemony, or as a means of exploring the dynamics of power at work throughout globalised agri-food, or as a means of exploring the alternative networks which already exist in the heterogeneous world in which we live. Together, they provide a better, more comprehensive, understanding of the nature of globalised agri-food.

Part III

The Place of Actor-Network Theory in Geographical Praxis

The purpose of this thesis has been to consider the nature of modelling in geography and to determine whether there is a place of Actor-Network Theory in geographical praxis. The simple answer to this question is yes. The journey travelled to reach this conclusion, however, was anything but simple. It took us on an exploration of modelling in general, beginning with an examination of the nature of knowledge and the role of modelling in the manufacturing of knowledge. In so doing it was necessary to consider forms of modelling within Foucault's *epistemes* and *dispositifs*, and in terms of the disciplinary structure derived from the Enlightenment and Kuhn's paradigms. From this, the inquiry proceeded to a consideration of the foundationalism of modernity and modern geography, heterogeneity, Foucaultian power and, eventually ethnography and Actor-Network Theory.

Following the theoretical reflections in part one, globalised agri-food was considered as a case study in which three approaches to understanding the nature of globalised agri-food were applied: a structuralist interpretation based upon Regulation Theory, a Foucaultian sketch and finally an Actor-Network approach. It was demonstrated that each of these approaches privileged certain elements of globalised

agri-food, thereby creating a specific understanding or viewpoint and, to draw upon Foucault, which ultimately defines the set of possibilities or scope of action for globalised agri-food.

Several theoretical traits of Actor-Network Theory have come to light in the course of this thesis. This includes its crucial ethnographic sensibility, a sensibility which directs our attention not simply towards the Other or to a groups aligned in society's margins, but towards the heterogeneous nature of society itself. Actor-Network Theory revels in explorations of alternate networks and forms of ordering which exist throughout a society along side what may be considered 'mainstream' networks of orderings and relations. To Heatherington (1997), this diversity constitutes a vital part of modernity itself. Secondly, Actor-Network Theory is afoundational, focussing on difference rather than the application of absolutes. Thirdly, Actor-Network Theory seeks to remove the human/non-human dichotomy, acknowledging that non-human actants can, and do, act upon the actions of people by establishing the set of possibilities available to people. Fourthly, Actor-Network Theory emphasizes the dynamic nature of relations and the inherent instability of reality through its examination of the dynamic nature of networks and the continual enrolling and withdrawing of actants from networks over time and space.

In this thesis, several other intriguing aspects of Actor-Network Theory have come to light through the two case studies examined in detail. Law, in his study of the Portuguese spice trade, illustrates the diverse nature of actants, how these act upon the other constituents and how in their convergence these create a stable network that is

both social and spatial in nature for a period of time. Secondly, his work illustrates the dynamic nature of networks. Most of the critical actants of the emerging *Carreira da India* were new innovations suggesting that network enrollment is not simply a passive undertaking enrolling existing actants; it can be a creative and driving force as well. Thirdly, the study clarifies the meaning of acting from a distance. The ability of the *Carreira da India* to extend itself, and Portuguese power is, as Law suggests, best explained not through any single model or discourse (be this imperial, military or economic in nature) but rather through an ethnographic approach in which the technological, the economic, the political, the social, and the natural are considered as an interrelated complex of network relationships.

Thorne's study of fair trade coffee networks reveals several other aspects of Actor-Network Theory. There is the recognition that alternate networks exist alongside the dominant networks. In this case, alternate agri-food networks are revealed as operating alongside dominant marketplace, agri-business structures. The idea of a core and margins is thus discarded and the spaces for alterity are understood as existing throughout a society and not merely on its 'margins.' Secondly, this study clearly illustrates how Actor-Network Theory crosses spatial scales. As Thrift observed, "where the concepts 'local' and 'global' work well for surfaces and geometry, they mean little for networks and topology" (Thrift 1999:290). This is certainly true in this study by Whatmore and Thorne. Thirdly, whereas in his study of the Portuguese spice trade Law utilizes Actor-Network Theory to address questions of history and historical analysis, in their study of fair trade networks, Whatmore and Thorne illustrate how Actor-Network

Theory can be used to reveal the myriad of complex networks at work simultaneously today. This study illustrates how alternate networks can lead to alternate social structures and alternate spatial organization. In their work on fair trade coffee networks, this alternate socio-spatiality incorporates not only networks of coffee growers, roasters, retailers and associated technological actants but also this network extends itself and becomes associated with other symbiotic networks including small-scale farming and organic farming techniques. Fourthly, and perhaps most importantly, is the idea that different non-human actants, whether these are technological, natural or even ideas, can serve as organising actants or principles for a network. In this case, it is the idea of fairness; in effect, an ethical actant is the organizing actant in the fair trade network. In so doing, Actor-Network Theory thus permits the re-engagement of questions of ethics and morality by geographers, sociologists and even scientists.

It has not been the purpose of this thesis to dismiss any form of modelling. Nor has it been the purpose to necessarily identify and claim any specific territory in the intellectual landscape for Actor-Network Theory. Each form of modelling has something to contribute. Each form of modelling has value, provided its limitations are acknowledged. Models and systems, by their nature, simplify or abstract the complexities inherent in that reality. Each involves the selection of a limited number of variables to represent reality. Every model, therefore, must be recognized as being based upon incomplete knowledge and, as a consequence, as being biassed. The purpose of this work has been to argue for a place for Actor-Network Theory in geographical praxis and nothing more.

Why is this so important? Models, and the knowledge generated through models, provide the basis upon which crucial political, economic, cultural and social decisions are made. We apply models to explore options. However, despite this important role, we often fail to question the nature of these models and the potential biases these contain. Why is it that we privilege certain forms of modelling? Why is it that we come to consider certain variables as crucial elements to include in a particular model while others are not? And, perhaps most important of all, why do we place so much importance on the knowledge derived from models?

Modelling serves as one means through which the world becomes comprehensible. The relevancy of modelling is, therefore, not the issue; the modelling of relevancy is. What is relevancy? How do we determine what is relevant? The question of relevancy has driven change in geography, certainly since the Second World War, if not since the Enlightenment Period itself. The Hartshorne/Schaefer debate over relevancy was significant not only for the transformation of geographical praxis which occurred as a result of this debate, but also because it was the first time that the question of relevancy was specifically raised and debated. The question of relevancy also drove Harvey and others from positivist geography to structuralism during the 1970s as geographers sought to secure geography's voice in such debates as that concerning social justice. This current work serves to illustrate that the relevancy debates linger still.

How are some questions deemed to be relevant while other questions are deemed to be interesting sidebars or minor distractions or even dismissed as irrelevant? It would seem that relevancy must be situated. In the case of modern, or Enlightenment-inspired,

geography that such determinations are often tied to foundational beliefs. Critics of modernity and its foundationalism point to the situatedness of existence. In an afoundational world, what is relevancy to be based upon? To Foucault, such determinations are tied to questions of power/knowledge. It might be suggested that Actor-Network Theory seeks a more immediate, local form of relevancy. If the purpose of modelling is to gain an understanding of reality, then it would seem that we must acknowledge, at the outset, the heterogeneous nature of that reality and develop approaches capable of engaging such a reality. It is suggested that Actor-Network Theory is one such approach, for, as argued throughout this thesis, proponents of Actor-Network Theory suggest the both the causes of social problems and possible answers to these problems already exist within Actor-Networks which constitute the social order of a society.

This leads to an interesting question: how, then, might the modern world be understood if foundationalism were to be erased from modernity? Seen through Actor-Network Theory, common terms, such as capitalism and globalisation, can be interpreted as simply the dominant Actor-Networks of this moment in time, or interpreted through Foucault as social and spatial dynamics derived from specific forms of power relations. If one were to remove the foundational assumptions of modernity, it is possible to expose the Grand Narratives for what they are – highly durable, expansive networks that have successfully enrolled actants from throughout society including social, economic, political actants and through which power is performed.

Does this absolution from foundationalism, however, lead to relativism? Perhaps it does. However, is this relativism any more dangerous to the universalizing and homogenizing imperative of foundationalism? Furthermore, does this imply that geography must abandon its modern forms of modelling? I do not think so. It is not necessary to reject modern modelling, nor the knowledge derived from such modelling provided these models and this knowledge is recognized for what they are, another viewpoint. These models need to be understood as reflecting a certain interpretation of networks or outcomes of power. If there is need to close with a word of caution, it is that a researcher should avoid adopting a single viewpoint when considering a social or spatial question. Instead, the researcher should explore such questions from a number of vantage points so as to secure a more comprehensive understanding of the nature of that question. Actor-Network Theory provides one tool, an ethnographic tool, which can help achieve this balance.

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