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The Ways of the World

DAVID HARVEY



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Foreword

I've been lucky enough to be involved in publishing many of David Harvey's books, from his first in 1969 to this one forty-seven years later. The former was *Explanation in Geography*, in which he recast the ways geographers collected, classified and interpreted data and how they generalised and based theories on it. He did so in the light of a range of other disciplines, especially philosophy, statistics and mathematics. He sought to bring what he called 'decent intellectual standards for rational argument' to geographical methodology and theorising. The book was a tour de force and swiftly acclaimed throughout the world. Harvey finished it while a lecturer in the Department of Geography at Bristol University. By the time it was published he had become an associate professor in the Department of Geography and Environmental Engineering at the Johns Hopkins University in Baltimore. Here his experience of the city in the aftermath of the 1968 riots dramatically changed the focus of his research and marked the start of his long association with the works of Karl Marx. The transition became evident two years later in 'Revolutionary and Counter-Revolutionary Theory in Geography and the Problem of Ghetto Formation', published here as Chapter 1. Its subject is in marked contrast to the book that preceded it, but Harvey's concern for the meticulous collection and analysis of data and rigorous interpretation of its significance for theory and practice is just as evident in both. It has remained characteristic of his work ever since.

In his commentary on Chapter 1 Harvey notes that his findings on the causes of housing problems in Baltimore won the admiration of city officials, landlords and financiers. In this case he admits he had failed to mention the Marxist basis of his analysis. His explorations of the protean nature of capital have continued to win plaudits from the capitalists he criticises, even when explicitly framed in Marxist terms: *The Enigma of Capital*, for example, published in 2010, was favourably reviewed in the *Financial Times* and the IMF's *Finance and Development*. You can see why when you read the sparklingly clear account of how capital evolves in Chapter 11. Like his illustrious

predecessor, Harvey is a brilliantly perceptive analyst of capital's history and adaptability, even as he diagnoses the causes of its crises and the inevitability of its demise.

My own favourites among the book's many high points include the account of what lies behind the building of Sacré-Coeur in Paris in Chapter 4, the exposition of time-space compression in his examination of postmodernism in Chapter 5, and the account in Chapter 8 of the strike by car workers in Oxford that moves from an analysis of the tensions between local action and global causes to a close consideration of the novels of Raymond Williams, as well as the theme recurring throughout the book of how problems of over-accumulation spill over, all too visibly, into unbridled urbanisation and the social ills that go with it.

This cornucopia of David Harvey's writing from every period, thus far, of his long and productive career will appeal to everyone already familiar with his work as much as it will to those coming to it for the first time.

John Davey

Introduction

Some astonishing news reports are coming out of China. The United States Geological Survey, which keeps tabs on these things, reports that China consumed 6,651 million tonnes of cement in the years 2011–13 compared with the 4,405 million tonnes the United States used over the period 1900–1999. In the United States we have poured a lot of concrete, but the Chinese must be pouring it everywhere at unconscionable rates. How and why could this be? And with what environmental, economic and social consequences?

These are the kinds of questions that this book is designed to shed light on. So let us look at the context of this bare fact and then consider how we can create a general framework for understanding what is happening.

The Chinese economy faced a serious crisis in 2008. Its export industries fell on hard times. Millions of workers (30 million by some estimates) were laid off because consumer demand in the United States (the chief market for Chinese goods) had fallen off a cliff: millions of households in the US either lost or were threatened with losing their homes to foreclosure and they were certainly not rushing out to the shopping malls to buy consumer goods. The property boom and bubble in the United States from 2001 to 2007 was a response to the crash of the earlier ‘dot-com’ stock market bubble in 2001. Alan Greenspan, Chair of the US Federal Reserve, then engineered low interest rates so capital being rapidly withdrawn from the stock market moved into the property market as its preferred destination until the property bubble burst in 2007. Thus do the crisis tendencies of capital get moved around. The crisis of 2008, manufactured mainly in the housing markets of the American South-West (California, Arizona and Nevada) and South (Florida and Georgia) produced millions of unemployed workers in the industrial regions of China by early 2009.

The Chinese Communist Party knew it had to put all those unemployed workers back to work or face the threat of massive social unrest. By the end of 2009 a detailed joint study of the International Monetary Fund and the International Labour Organisation estimated that the net job loss in China

as a result of the crisis was around 3 million (compared to 7 million in the United States). The Chinese Communist Party somehow managed to create around 27 million jobs in a year. This is a phenomenal, if not unprecedented, performance.

So what did the Chinese do and how did they do it? They engineered a massive wave of investment in physical infrastructures. These were designed in part to spatially integrate the Chinese economy by setting up communication links between the vibrant industrial zones of the East Coast with the largely underdeveloped interior, as well as improving connectivity between southern and northern industrial and consumer markets which had hitherto been rather isolated from each other. This was coupled with a vast programme of forced urbanisation, building whole new cities as well as expanding and reconstructing the developed ones.

This response to conditions of economic crisis was not new. Napoleon III brought Haussmann to Paris in 1852 to restore employment by rebuilding the city after the economic crash and revolutionary movement of 1848. The United States did the same after 1945 when it deployed much of its increased productivity and surplus cash to build the suburbs and metropolitan regions (in the style of Robert Moses) of all the major cities while also integrating the South and West into the national economy through the construction of the interstate highway system. The aim in both cases was to create relatively full employment for surpluses of capital and labour and thereby assure social stability. The Chinese after 2008 did the same but, as the data on cement consumption indicate, they did so through a shift in scale. Such a shift had also been seen before: Robert Moses worked at a far larger metropolitan region scale than Baron Haussmann, who focused on the city alone. After 2008 at least a quarter of China's GDP was derived from housing construction alone and when to this is added all the physical infrastructures (such as high-speed rail lines, highways, dam and water projects, new airports and container terminals, etc.), roughly half of China's GDP and almost all of its growth (which bordered on 10 per cent until recently) were attributable to investment in the built environment. This was how China got out of the recession. Hence the pouring of all that concrete.

The knock-on effects of these Chinese initiatives were dramatic. China consumed some 60 per cent of the world's copper and more than half of world's output of iron ore and cement after 2008. Accelerating demand for raw materials meant that all those countries supplying minerals, oil, agricultural products (timber, soya beans, hides, cotton, etc.) quickly shook off the effects of the crash of 2007–08 and experienced rapid growth (Australia,

Chile, Brazil, Argentina, Ecuador...). Germany, which supplied the Chinese with high-quality machine tools, also thrived (as opposed to France, which did not). Crisis resolutions move around as fast as crisis tendencies. Hence the volatility in the geography of uneven developments. But there is no question that China took a leading role in saving global capitalism from disaster after 2008 with its massive urbanisation and investments in the built environment.

How did the Chinese do it? The basic answer is simple. They debt-financed. The Central Committee of the Communist Party told the banks to lend no matter what the risk. Municipalities as well as regional and village administrations were told to maximise their developmental initiatives, while the terms of borrowing for investors and consumers were relaxed to buy apartments for either living or investing in. As a result, the growth of the Chinese debt has been spectacular. It has nearly doubled since 2008. China's debt to GDP ratio is now one of the highest in the world. But unlike Greece, the debt is owed in renminbis and not dollars or euros. The Chinese central bank has plenty of foreign reserves to cover the debt if need be and could print its own money at will. The Chinese took Ronald Reagan's (surprising) view that deficits and debt do not matter. But by 2014 most municipalities were bankrupt, a shadow banking system had also grown up to disguise the gross overextension of bank lending to non-earning projects and the property market had become a veritable casino of speculative volatility. Threats of devaluation of property values and of overaccumulated capital in the built environment began to materialise by 2012 and crested in 2015. China experienced, in short, a predictable problem of overinvestment in the built environment (as had happened to Haussmann in Paris in 1867 and to Robert Moses between the end of the 1960s and the New York fiscal crisis of 1975). The massive wave of fixed capital investment should have increased productivity and efficiency within the space of the Chinese economy as a whole (as happened in the case of the interstate highway system in the United States during the 1960s). Investing half of GDP growth in fixed capital that produces declining growth rates is not a good proposition. The positive knock-on effects of China's growth were reversed. As China's growth slowed, commodity prices fell, sending the economies of Brazil, Chile, Ecuador, Australia etc. into a tail spin.

So how do the Chinese propose to deal with their current problems of disposing of their surplus capital in the face of overaccumulation in the built environment and rapidly escalating indebtedness? The answers are just as startling as the data on cement use. To start with, the Chinese are planning to build a single city to house 130 million people (the combined population of Britain and France). Centred on Beijing and pinned together by high-speed

transport and communications networks (that will ‘annihilate space through time’ as Marx once put it) in a territory no bigger than Kentucky, this debt-financed project is designed to absorb surpluses of capital and of labour well into the future. How much cement will be poured is anybody’s guess, but it will surely be huge.

China is not the only place contemplating projects of this sort. Smaller versions can be found everywhere. The recent dramatic urbanisation of the Gulf States is one obvious example. Turkey plans to convert Istanbul into a city of some 45 million (it is currently around 18) and has begun a huge programme of urbanisation on the northern end of the Bosphorus. A new airport and bridge over the Bosphorus are already under construction. Unlike China, however, Turkey cannot do this by going into debt in its own currency and international bond markets are turning nervous about the risks. This particular project threatens to stall. Building booms, with rising property prices and rents, are in evidence in almost every major city in the world. We certainly have one in New York City. They had a vigorous one in Spain until it all collapsed in 2008. And when the collapse comes it reveals a lot about the wastefulness and foolishness of the investment schemes that get left behind. A whole new airport costing a billion or more euros was built in Ciudad Real just south of Madrid. But no planes came and the airport venture went bankrupt. The top bid when it was put up for auction in the spring of 2015 was 10,000 euros.

But for the Chinese, doubling down on city building is not enough. They are also looking beyond their borders for ways to absorb their surplus capital and labour. There is a project to rebuild the so-called ‘Silk Road’ that linked China to Western Europe through Central Asia in medieval times. ‘Creating a modern version of the ancient trade route has emerged as China’s signature foreign policy initiative under President Xi Jinping,’ write Charles Clover and Lucy Hornby in the *Financial Times* (12 October 2015). The rail network would run from the East Coast of China through Inner and Outer Mongolia and the central Asian states to Tehran and Istanbul, from where it will fan out across Europe as well as branching off to Moscow. It is already the case that commodities from China can get to Europe by this route in four days instead of the seven taken by ocean transport. Lower costs and faster times on the Silk Road in the future will convert a largely empty area in central Asia into a string of thriving metropolises. This is already happening. In exploring the rationale for the Chinese project, Clover and Hornby pointed to the pressing need to absorb the vast surpluses of capital and of materials like cement and steel in China. The Chinese, who have absorbed and then

created an increasing mass of surplus capital over the last thirty years now desperately seek what I call a 'spatial fix' (see chapter 2) to their problems of surplus capital.

This is not the only global infrastructure project that interests the Chinese. The Initiative for the Integration of the Regional Infrastructure in South America (IIRSA) was launched in 2000 as an ambitious programme to create transport infrastructures for the circulation of capital and commodities over twelve South American states. Transcontinental links pass through ten growth poles. The most ambitious projects connect the West (Peru and Ecuador) to the East (Brazilian) Coast. But the Latin American countries do not have the finance. Enter China, which is particularly interested in opening up Brazil to their trade without the time-consuming detours of sea routes. In 2012 they signed an agreement with Peru to begin upon the route over the Andes towards Brazil. The Chinese are also interested in financing the new canal through Nicaragua to compete with that in Panama. In Africa the Chinese are already hard at work (using their own labour and capital) integrating the transport systems of East Africa and are interested in constructing transcontinental railways from one coast to the other.

I recount these stories to illustrate how the world's geography has been and is being constantly made, remade and sometimes even destroyed in order to absorb rapidly accumulating surpluses of capital. The simple answer to the question of why this is happening is: because the reproduction of capital accumulation requires it. This sets the stage for a critical evaluation of the potential social, political and environmental consequences of such processes and raises the issue of whether we can afford to continue on this path or whether we need to check or abolish the impulse to the endless accumulation of capital that lies at its root. This is the unifying theme that links together the seemingly disparate chapters in this book.

That creative destruction of the world's geographical environment is going on all the time is obvious – we see it around us, read of it in the press and hear about it on the news every day. Cities like Detroit flourish for a while and then collapse as other cities boom. Ice caps melt and forests shrink. But the idea that to understand all this might require something more than mere description, that we need to create new frameworks for understanding how and why 'things happen' the way they do, is more than a little revolutionary. Economists, for example, typically construct their theories as if geography is the fixed and unchanging physical terrain upon which economic forces play out. What could be more solid than mountain ranges like the Himalayas, the Andes or the Alps or more fixed than the shape of the continents and the

climatic zones that girdle the earth? Recently, respected analysts like Jeffrey Sachs in *The End of Poverty: Economic Possibilities of our Time* (2005) and Jared Diamond in *Guns, Germs and Steel: The Fates of Human Societies* (1997) have written best-selling books suggesting that geography construed as the fixed and unchanging physical environment is destiny. Most of the differentials in the wealth of nations, notes Sachs, correlate with distance from the equator and access to navigable water. Others, like Daron Acemoglu and James Robinson in *Why Nations Fail: The Origins of Power, Prosperity, and Poverty* (2012), write best-selling books disputing that view. Geography, they say, has nothing to do with it. The historically and culturally constructed institutional framework is what matters. The one party says Europe grew wealthy and became the birthplace of free market capitalism because of its rainfall regime, jagged coastline and regional ecological diversity, while China was held back by a smooth coastline that inhibited easy navigation and a hydrological regime that required centralised and bureaucratic state management hostile to free markets and individual initiative. The other party says that institutional innovations stressing private property and a fragmented structure of state and regional powers emerged perhaps by accident from Europe to impose an extractive imperialism upon densely populated parts of the world (like India and China) which until recently held their economies down, contrasting radically with the openness of settler colonialism in the Americas and Oceania that stimulated free market economic growth. Compelling histories of humanity have been constructed around analogous themes: think of Arnold Toynbee's monumental *Study of History*, in which environmental challenges and human responses lie at the root of historical transformations, or the more recent surprising popularity of Jared Diamond's *Guns, Germs and Steel*, where environment dictates all.

What I suggest in the essays assembled here is at odds with both these traditions, not least because both are, quite simply, wrong. They are wrong not because they get the details wrong, which they plainly do (the smoothness of China's coastline versus the jagged coastline of Europe depends entirely on the scale of the map one consults), but because their definition of what is or is not geographical makes no sense: it depends on an artificial Cartesian separation of nature from culture, whereas it is impossible on the ground and in the streets to see where nature ends and culture begins. Imposing a dichotomy where there is none is a fatal mistake. Geography is expressive of the unity of culture and nature and not the product of some causal interaction with feedback, as it is so commonly represented. This fiction of a duality produces all manner of political and social disasters.

As the recent history of China shows, the geography of the world is not fixed but constantly changing. Shifts in the time and cost of transportation, for example, are perpetually redefining the relative spaces of the global economy. The draining of wealth from East to West from the eighteenth century onwards could not have occurred without the new technologies of transportation and military dominance that changed the space-time coordinates of the global economy (particularly with the coming of the railways and the steamship). It is relative and not absolute space that matters. Hannibal had a lot of trouble getting his elephants over the Alps but the building of the Simplon Tunnel dramatically changed the ease of movement of commodities and people between most of Europe and northern Italy.

In these essays I aim to find a framework to understand the processes making and remaking our geography and the consequences thereof for human life and the environment of planet earth. I say a 'framework' rather than a specific and tightly ordered theory because the geography is constantly changing, not merely because humans are active agents in creating environments conducive to the reproduction of their mode of production (such as capitalism), but because simultaneous transformations are taking place in the world's ecosystems under other impulses. Some, but by no means all, of these changes are unintended consequences of human actions: think of global climate change, sea level rises, ozone hole formation, degraded air and water qualities, oceanic debris and declining fish stocks, species extinctions, and the like. Meanwhile, new pathogens and viruses (HIV/AIDS, Ebola, West Nile virus) arise and older pathogens are either eliminated (smallpox) or, like malaria, appear recalcitrant in the face of attempts by humans to control them. The natural world we inhabit is also in constant motion as the movement of tectonic plates spews out volcanic lavas and sparks earthquakes and tsunamis, while sunspots affect the earth in disparate ways.

The reproduction of our geographical environment occurs in myriad ways and for all manner of reasons. Haussmann's boulevards in Paris were partly conceived of as military installations designed for military and social control of a traditionally restive urban population, just as the current spate of dam building in Turkey is mainly designed to destroy by flooding the agrarian base of the autonomous Kurdish movement while criss-crossing south-east Anatolia with a series of moats to inhibit the movement of the insurgent guerrillas seeking Kurdish independence. That the building of both the boulevards and the dams absorbs surplus capital and labour appears entirely incidental. Cultural perceptions and mores are constantly being built into the landscape in specific ways as the landscape itself becomes a series of

mnemonics (like Sacré-Coeur in Paris or a mountain like Mont Blanc) that signal identity and social and collective meanings. The hilltop towns and villages of Tuscany contrast with the bare hilltops regarded as sacred and untouchable spaces in Korea. To try to cram diverse features of this sort into a single coherent theory is plainly impossible. But this does not mean the production of geography surpasses all human understanding. That is why I write of 'frameworks' for understanding the making of new geographies, the dynamics of urbanisation and uneven geographical developments (why some places thrive while others decline) and the economic, political social and environmental consequences for life on planet earth in general and daily life in the mosaic of neighbourhoods, towns and regions into which the world is divided.

To create such frameworks requires that we explore process-based philosophies of enquiry and embrace more dialectical methods in which the typical Cartesian dualities (such as that between nature and culture) are dissolved into a single flow of historical and geographical creative destruction. While this may at first seem hard to grasp, it is possible to locate events and processes such that we might better divine how to navigate dangerous seas and venture onto uncharted lands. There is nothing, of course, that guarantees that the framework will prevent shipwrecks or stop us falling into quicksands, getting becalmed or becoming so discouraged we just give up. Anyone looking at the contemporary tangle of relations and interactions occurring in the Middle East can surely understand my meaning.

The cognitive maps provide some pegs and handholds with which to survey how such messes can occur and perhaps hints as to how we might take an exit from the predicaments we face. This is a bold claim. But in these difficult times it takes a certain boldness and the courage of our convictions, to go anywhere. And we should do so in the certainty we will make mistakes. Learning, in this instance, means extending and deepening the cognitive maps we carry in our heads. These maps are never complete and in any case are rapidly changing, these days at faster and faster rates. The cognitive maps, compiled over some forty years of working, thinking and dialoguing with others, are incomplete. But perhaps they provide a foundation for a critical understanding of the ways of the complicated geography in which we live and have our being.

This raises questions about what the ways of our future world might look like. Do we want to live in a city of 130 million people? Is pouring concrete everywhere in order to keep capital from falling into crisis a reasonable thing to do? I don't find the vision of that new Chinese city particularly attractive

for all manner of reasons – social, environmental, aesthetic, humanistic and political. Maintaining any sense of personal or collective worth, dignity and meaning in the face of such a developmental juggernaut appears a mission destined for failure, productive of the deepest alienations. I can't imagine that many of us would personally will it, promote it or plan it, though, evidently, there are some futurologists who are fanning the flames of these utopian visions and enough serious journalists who are convinced or captivated enough to want to report on the initiatives, along with financiers controlling capital surpluses ready and desperate to deploy them and make the visions real.

It is, I recently concluded in *Seventeen Contradictions and the End of Capitalism*, both logical and imperative in our times to seriously consider the changing geography of the world from a critical anti-capitalist perspective. If sustaining and reproducing capital as a dominant form of political economy requires, as seems to be the case, pouring concrete everywhere at an ever-increasing rate, then surely it is time to at least question if not reject the system that produces such excesses. Either that, or the apologists for contemporary capitalism have to show that the reproduction of capital can be achieved by other less violent and less destructive means. I await that debate with interest.

Chapter 1

Revolutionary and Counter- Revolutionary Theory in Geography and the Problem of Ghetto Formation

How and why would we bring about a revolution in geographic thought? In order to gain some insight into this question, it is worth examining how revolutions and counter-revolutions occur in all branches of science. Kuhn¹ provides an interesting analysis of this phenomenon as it occurs in the natural sciences. He suggests that most scientific activity is what he calls normal science. This amounts to the investigation of all facets of a particular paradigm (a paradigm being a set of concepts, categories, relationships and methods which are generally accepted throughout a community of scientists at a given point in time). In the practice of normal science, certain anomalies arise – observations or paradoxes which cannot be resolved within an existing paradigm. These anomalies become the focus of increasing attention until science is plunged into a period of crisis in which speculative attempts are made to solve the problems posed by the anomalies. Out of these attempts there eventually arises a new set of interlocking concepts, categories, relationships and methods which resolve the existing dilemmas while preserving and incorporating the worthwhile aspects of the old paradigm. Thus, a new paradigm is born and is followed once more by the onset of normal scientific activity.

Kuhn's schema is open to criticism on a number of grounds. I shall discuss two problems very briefly. First, there is no explanation as to how anomalies arise and how, once they have arisen, they generate crises. This criticism could be met by distinguishing between significant and insignificant anomalies. For example, it was known for many years that the orbit of Mercury did not

fit Newton's calculations, yet this anomaly was insignificant because it had no relevance to the use of the Newtonian system in an everyday context. If certain anomalies had arisen in bridge construction, then they would obviously have been deemed highly significant. The Newtonian paradigm remained satisfactory and unchallenged until something of practical importance and relevance could not be accomplished by appealing to it.

Secondly, there is the question, never satisfactorily answered by Kuhn, concerning the way in which a new paradigm becomes accepted. Kuhn admits that acceptance is not a matter of logic. He suggests rather that it involves a leap of faith. What is this leap of faith based on? Underlying Kuhn's analysis is a guiding force which is never explicitly examined. In his history this guiding force is rooted in a fundamental belief in the virtues of control and manipulation of the natural environment. The leap of faith, apparently, is based on the belief that the new paradigm will extend and deepen this power. But which aspect of nature? Presumably it will be an aspect of nature which is important in terms of everyday activity and everyday life at a particular point in history.

The central criticism of Kuhn, which these two criticisms point to, is his abstraction of scientific knowledge-making from its historical materialist context. Kuhn provides an *idealist* interpretation of scientific advancement, when it is clear that scientific thought is fundamentally geared to material activities. The historical materialist basis for the advancement of scientific knowledge has been explored by Bernal.² Material activity involves the manipulation of nature in the interests of man, and scientific understanding cannot be interpreted independently of that general thrust. However, at this juncture, we are forced to add a further perspective because 'the interest of man' is subject to a variety of interpretations, depending on which sector of society we are thinking of. Bernal points out that the sciences in the West have until very recently been the preserve of a middle-class group, and even recently, with the rise of what is often called the 'meritocracy', the scientist is often drawn into middle-class ways of life and thought in the course of his or her career. We may thus expect the natural sciences tacitly to reflect a drive for manipulation and control over those aspects of nature which are relevant to the middle class. Far more important, however, is the harnessing of scientific activity by a process of patronage and funded research to the special interests of those who are in control of the means of production and finance. The coalition of industry and government heavily directs scientific activity. Consequently, 'manipulation and control' means manipulation and control in the interests of particular groups in society (specifically, the industrial

and financial community together with the middle class) rather than in the interests of society as a whole.³ With these perspectives we are better able to understand the general thrust of scientific advancement hidden within the recurrent scientific revolutions which Kuhn has so perceptively described.

It has frequently been questioned whether Kuhn's analysis could be extended to the social sciences. Kuhn appears to view the social sciences as 'pre-scientific' in the sense that no one social science has really established that corpus of generally accepted concepts, categories, relationships and methods which form a paradigm. This view of the social sciences as pre-scientific is, in fact, quite general among philosophers of science.⁴ However, a quick survey of the history of thought in the social sciences shows that revolutions in thinking do indeed occur and that they are marked by many of the same features which Kuhn identified in the natural sciences. There is no question that Adam Smith provided a paradigmatic formulation for economic thought which was subsequently built upon by Ricardo. In modern times Keynes succeeded in doing something essentially similar to Smith and he provided a paradigmatic formulation which dominated economic thought in the West until 1970 or so. Johnson⁵ explores such revolutions in thought in economics. His analysis parallels in many respects that of Kuhn, adding, however, several extra twists. At the heart of the Keynesian revolution, Johnson asserts, was a crisis generated by the failure of pre-Keynesian economics to deal with the most pressing and significant problem of the 1930s – unemployment. Thus, unemployment provided the significant anomaly. Johnson suggests that:

By far the most helpful circumstance for the rapid propagation of a new and revolutionary theory is the existence of an established orthodoxy which is clearly inconsistent with the most salient facts of reality, and yet is sufficiently confident of its intellectual power to attempt to explain those facts, and in its efforts to do so exposes its incompetence in a ludicrous fashion.

Thus the objective social realities of the time overtook the conventional wisdom and served to expose its failings.

In this situation of general confusion and obvious irrelevance of orthodox economics to real problems, the way was open for a new theory that offered a convincing explanation of the nature of the problem and a set of policy prescriptions based on that explanation.

So far, the similarity to Kuhn is quite remarkable. But Johnson then adds new considerations, some of which really stem from the sociology of science itself. He asserts that a newly accepted theory had to possess five main characteristics:

First, it had to attack the central proposition of conservative orthodoxy ... with a new but academically acceptable analysis that reversed the proposition ... Second, the theory had to appear to be new, yet absorb as much as possible of the valid or at least not readily disputable components of existing orthodox theory. In this process, it helps greatly to give old concepts new and confusing names, and to emphasise as crucial analytical steps that have previously been taken as platitudinous ... Third, the new theory had to have the appropriate degree of difficulty to understand ... so that senior academic colleagues would find it neither easy nor worthwhile to study, so that they would waste their efforts on peripheral theoretical issues, and so offer themselves as easy marks for criticism and dismissal by their younger and hungrier colleagues. At the same time the new theory had to appear both difficult enough to challenge the intellectual interest of younger colleagues and students, but actually easy enough for them to master adequately with sufficient investment of intellectual endeavour ... Fourth, the new theory had to offer to the more gifted and less opportunistic scholars a new methodology more appealing than those currently available ... Finally, [it had to offer] an important empirical relationship ... to measure.

The history of geographic thought in the last ten years is exactly mirrored in this analysis. The central proposition of the old geography was the qualitative and the unique. This clearly could not resist the drive in the social sciences as a whole towards tools of social manipulation and control which require an understanding of the quantitative and the general. Nor can there be any doubt that during the transition process old concepts were given new and confusing names and that fairly platitudinous assumptions were subject to rigorous analytical investigation. Moreover, it cannot be denied that the so-called quantitative revolution in geography allowed the opportunity to pillory the elder statesmen in the discipline, particularly when they ventured into issues related to the newly emerging orthodoxy. Certainly, the quantitative movement provided a challenge of appropriate difficulty and opened up the prospect for new methodologies – many of which were to be quite rewarding in terms of the analytic insights they generated. Lastly, new

things to measure were in abundance; and in the distance-decay function, the threshold, the range of a good, and the measurement of spatial patterns geographers found four apparently crucial new empirical topics which they could spend an inordinate amount of time investigating. The quantitative movement can thus be interpreted partly in terms of a challenging new set of ideas to be answered, partly as a rather shabby struggle for power and status within a disciplinary framework, and partly as a response to outside pressures to discover the means for manipulation and control in what may broadly be defined as 'the planning field'. In case anyone misinterprets these remarks as pointing a finger at any one particular group, let me say that all of us were involved in this process and that there was and is no way in which we could or can escape such involvement.

Johnson also introduces the term 'counter-revolution' into his analysis. In this respect his thought is not very enlightening, since he clearly has an axe to grind in criticising the monetarists, whom he designates as counter-revolutionaries, even though a significant anomaly (the combination of inflation and unemployment) exists as a pressing challenge to the Keynesian orthodoxy. But there is something very important in this term which requires analysis. It seems intuitively plausible to think of the movement of ideas in the social sciences as a movement based on revolution and counter-revolution, in contrast to the natural sciences to which such a notion does not appear so immediately applicable.

We can analyse the phenomena of counter-revolution by using our insight into paradigm formation in the natural sciences. This is based on the extension of man's ability to manipulate and control naturally occurring phenomena. Similarly, we can anticipate that the driving force behind paradigm formation in the social sciences is the desire to manipulate and control human activity and social phenomena in the interest of man. Immediately the question arises as to who is going to control whom, in whose interest is the controlling going to be exercised, and if control is exercised in the interest of all, who is going to take it upon himself or herself to define that public interest? We are thus forced to confront directly in the social sciences what arises only indirectly in the natural sciences, namely, the social bases and implications of control and manipulation. We would be extraordinarily foolish to presuppose that these bases are equitably distributed throughout society. Our history shows that usually these bases are highly concentrated within a few key groupings in society. These groups may be benevolent or exploitive with respect to other groups. This, however, is not the issue. The point is that social science formulates concepts, categories, relationships and