

Abstract:

Drawing upon Ian Hacking's idea of "styles of scientific reasoning," the paper argues that there is an abrupt intellectual break between spatial science and the 'cultural turn' as they have been practised in Anglo-American economic geography over the last forty years. Each style has brought with it its own criteria of truth, and created its own object of investigation. As a result, direct comparison and integration of the two are very difficult. One potential way forward is making use of Peter Galison's idea of a "trading zone."

Keywords: Economic geography, styles of scientific reasoning, spatial science, 'cultural turn'

Styles of the Times: The 1960s Science of Space versus the Millennial Culture of Place in Anglo-American Economic Geography

The humorous premise of the Austin Powers movies is that the eponymous British MI5 spy is cryogenically put to sleep in 1967 and woken up three decades later. After he is revived in the late 1990s, he continues to live culturally in the 1960s wearing a crushed velvet suit with bell-bottom trousers, feeding a stack of over-sized cassette tapes into the eight-track player of his (original) Mini Cooper, and spouting swinging 60's English slang – "Oh Groovy, Baby." In Anglo-American economic geography, the equivalent to Austin Powers would be a return of the 1960s male spatial scientist, wearing a short-sleeve shirt with pocket protector, feeding a stack of FORTRAN punch cards into a massive mainframe computer, and spouting 60s quantitative geography jargon – "it's at the 95% confidence level (Baby)." In the interim, just like the wider culture to which Austin Powers has returned, economic geography has changed dramatically. In the same way that Austin Powers no longer fits a millennial Western culture that discarded velvet suits for Armanis, eight-track tapes for CDs, and sexist slogans for politically correct ones, so economic geography traded in most of its former 1960s spatial science look. There are now large numbers of women in the profession, and not prone toward pocket protectors even as fashion accessories. While almost everyone uses a computer, it is now on her or his desk or shoulder rather than in a separate building, requiring no knowledge of FORTRAN, and rarely used for calculation. And the old lexicon of spatial science couched in terms of bid-rent curves, nested hierarchies, topological axioms, and confidence levels, is replaced by a new one of cultural embeddedness, institutional thickness, performance, and economic signs and symbols. Just as Austin Powers is out of style with the wider culture in which he finds himself, so is spatial science in economic geography which has been transformed as a discipline by a wider "cultural turn" (Barnes, 2001).

That "cultural turn," and which over the 1990s affected a large number of disciplines in both the humanities and social sciences, is about recognising and providing an analytical space for culture. Of course, culture was present in Anglo American economic geography from the beginning (Barnes, 2003), but it is only recently that economic geography engaged culture explicitly both in theory and in substance with consequential transformation of the discipline.

Compare, for example, two exemplary volumes of readings in economic geography appearing thirty years apart. The first, and published serendipitously in 1967, the year Austin Power is sent to sleep, is Smith, Taaffe and King's (1967) Readings in Economic Geography: The Location of

Economic Activity. Consisting of thirty essays, the collection is concerned with “theories of why economic activities are located where they are” (Smith, Taaffe, and King, 1967, 13). By theory is meant the type of theory found (sometimes literally) in the physical sciences. It is Greek letter theory, involving the assembling of concise mathematical statements that connect explanatory variables, and which are then tested against empirical data using a set of rigorous statistical methods. So, after stating central place theory as a set of seven equations, Berry and Barnum (1967) test it against the real world of Southwest Iowa using regression analysis. Or, having identified five variables, and three constraints, and set within a linear programming equation, Casetti (1967) calculates the optimal location of steel mills for Quebec and Southern Ontario. The second volume, and published in 1997, the year Austin Powers is awoken, is Lee and Wills’ (1997) Geographies of Economies. Consisting of thirty-two essays, the theme of the book is economic hybridity. The economy is not an isolated entity, as it was under spatial science, hermetically sealed from politics, society, and culture. Rather, there is continual leakage so much so that even identifying something separate called the economy is very difficult, if not impossible. For example, in McDowell’s (1997a) chapter, the cultural performances of workers in the City of London financial markets – what they wear, how they speak, how they hold their bodies – are a fundamental part of what they do when they perform economically and make money. Or, in Massey’s (1997) essay, the household culture of Cambridge high tech workers, and the gender relations that it implies, is every bit as important in maintaining that place-based sector as what workers do in their offices in front of computer terminals every day.

The upshot is that in moving from spatial science to the cultural turn Anglo-American economic geography studies not only quite different things (the geometry of service work vs. the department of service sector workers, the optimal location of iron and steel mills vs. the gender division of household labour), but uses dramatically different methods (geometrical theorems vs. performance theory, linear programming vs. feminist analysis). Furthermore, and central for this paper, the geographical focus changes: from abstract spaces to concrete places. Under spatial science the intent is to deploy formal transformations that render all places comparable, to turn them into one continuous homogenous space that is mathematically tractable, and hence explainable by an abstract logic. In contrast, the cultural turn is about keeping places intact, not transforming them into an theoretical calculus, but working away at their contingent concreteness, materiality and singularity: in the trading rooms of London’s merchant banks, or in the homes of Cambridge high-tech workers.

But how do we understand and explain this intellectual transformation in Anglo-American economic geography from spatial science to the cultural turn? My intention is to use the idea of “styles of scientific reasoning,” a term most associated with the philosopher and historian of science, Ian Hacking (2002a & b), and recently appointed as Chair of the Philosophy and History of Scientific Concepts at the Collège de France. Resonating with Kuhn’s concept of paradigms, a style of scientific reasoning connotes both the historical-cultural nature of intellectual projects – they are “styles” – and their peculiar nature based upon specialised vocabularies, logics, practices and forms of explanation – “scientific reasoning.” In particular, for Hacking, their most interesting features is that they are “self-authenticating” (Hacking, 2002a, 4); that is, they determine both the criteria of truth by which they are judged, and bring into being the objects that they claim to study. As a result, direct comparison of different styles, such as spatial science and the cultural turn, are very difficult.

There is another important point that Hacking makes about styles of scientific reasoning. Their emergence is dependent upon a set of historically contingent conditions, and which Hacking (2002b, 14) terms a “space of possibilities.” He gives as an example the eighteenth-century Scottish philosopher David Hume who first states the method of induction – a scientific style of reasoning – in his Treatise in 1739 that then informs philosophical debate down to the present. Hacking’s argument is that the “space of possibilities” for induction was not present much before Hume. For induction to be conceived, and which rests on the generalization of a set of separate facts, it is necessary that the idea of a fact as small and detached, as a particle of information, exist. As Mary Poovey (1998) shows, such a conception of facts is not current until the late seventeenth century. A major style of scientific reasoning, therefore, is predicated on the emergence of a historically contingent ontology of fact making – it is induction’s space of possibility. Similarly, I will argue that particular spaces of possibility were necessary for the emergence of both spatial science and the cultural turn in economic geography. Certain contingent historical conditions had to be present for economic geographers to think in different styles.

Hacking works on a large historical canvas, and is concerned with the major styles of Western scientific reasoning from the Ancient Greeks onwards. The concerns of this paper are much narrower in comparison: with just the last forty years, and with the discipline and practice of geography in only Anglo America. Nonetheless, Hacking’s scheme is useful. It suggests that first we should see the change from spatial science to the cultural turn as an abrupt break, with each bringing its own criteria of truth and creating an object of investigation, thereby also making direct comparison difficult; and second that both styles require a particular set of historical conditions for their realisation. In pursuing both lines of argument, the paper is divided into two main sections. First, I expand on my remarks about scientific style. Second, I discuss spatial science and the cultural turn in economic geography as peculiar styles of scientific reasoning. Finally, in the conclusion, I speculate about the desirability, and possibility of combining spatial science and the “cultural turn.”

Styles of Scientific Reasoning

Before Kuhn’s (1962) The Structure of Scientific Revolutions, explaining scientific intellectual change was easy. Old theories gave way to new ones because the new ones better approximated the truth. And they were more truthful because they were more rational, logical, and internally coherent. Truth, then, was conceived as the consequence of applying rationality; it was the foundation guaranteeing verisimilitude. In this view, theories that were less rational would be always discarded in favour of those that were more so. So, Ptolemy’s geocentric view of planetary motion based upon intuitively drawn epicycles was replaced by Galileo’s heliocentric one resting on equations and numbers. Or closer to home, Huntington’s (1924) environmentally determinist view of development based on comparative subjective eyeballing of different maps was rejected in favour of Taaffe, Morrill and Gould’s (1963) diffusion model resting on negative exponentials and axioms of topology.

Kuhn’s book undermined this rationalist interpretation (and anticipated earlier in France in the writings of Bachelard and Canguilhem). Kuhn argued that smooth replacement of one approach

to science by another through rational discourse was a fiction because such approaches, which he labelled paradigms, were fundamentally incommensurable. There were no independent rational criteria available to make comparison. Instead, for Kuhn, intellectual change proceeded by means of a series of “Gestalt shifts” in which everything alters. There is no comparability. Key theoretical terms, instruments, measuring devices and metrics, and experimental practices all change from one paradigm to another thus vitiating rational evaluation. Scientific change is characterised by abrupt incommensurable disjunctions rather than by smooth cumulative progress.

By dethroning a timeless, universal rationality, Kuhn’s work cleared space for the possibility of explaining paradigm change historically and sociologically. To understand why one theory replaces another, it is necessary to look beyond the ghost of rationality to the actions and beliefs of real people, living in particular historical and social settings, struggling to make sense of their contingent world. Moreover, Kuhn’s historical and sociological perspective applied not just within the physical sciences, his central concern, but also within the social sciences, including even in economic geography that over the course of its history has been subject to a series of paradigm changes that demand understanding.

It is within this context that Ian Hacking’s work on “styles of scientific reasoning” is useful, and especially for my task of understanding intellectual change in economic geography. Hacking’s work is a continuation of Kuhn’s historical, anti-rationalist project (and part of a much wider literature now known as science studies; Hess, 1997). Hacking (2002b, 182) thinks that the history of Western science is characterised by a distinct set of non-overlapping styles of scientific reasoning (of which he names six: mathematics, statistical analysis, theoretical modelling, the experimental method, taxonomy, and genetic development). They are non-overlapping because as for Kuhn there is no rational comparison and means for integration; they are their own Gestalt worlds.

Two features of Hacking’s characterisation of styles of scientific reasoning are particularly important for this paper. First, styles determine the very criteria of evaluation by which they are judged. As Hacking (1985: 146) writes, “... the very candidates for truth and falsehood have no existence independent of the styles of reasoning that settle what it is to be true and false in their domain.” The statistical style of reasoning, for example, determines what counts as statistically true and false. It brings into existence those very criteria. It is not that Ancient Greeks, say, would have different criteria of what is statistically true or false; they would have no criteria because the very idea of having such criteria only emerges with the development of probability that occurs sometime during the European Renaissance. Second, styles bring into being the subject matter that they claim to study. Hacking (2002b, 189) provides a list, and which “include[es] new types of: objects; evidence; sentences new ways of bringing a candidate for truth and falsehood; laws, or at any rate modalities; and possibilities.” To continue the previous example, brought into being by the statistical style of reasoning were new objects, such as Francis Galton’s quincunx, a machine that showed that sets of different normal distributions themselves conform to a normal distribution; new evidence such as numbers compiled by national statistical agencies; new sentences such as Galton’s correlation and regression equations; new laws such as the law of large numbers; and new possibilities such as novel forms of regulation and disciplining a population (all discussed in Hacking, 1990).

The consequence of both features is that styles of scientific reasoning are “self-authenticating.” They bring with them their own criteria of assessment and objects of investigation, making them resistant to external criticism. As Hacking (1985, 146) writes, “the sense of a proposition p , the way in which it points to truth or falsehood, hinges on the style of reasoning appropriate to p . Hence we cannot criticise that style of reasoning, as a way of getting to p , or to not- p , because p simply is the proposition whose truth value is determined in this way.” Rather, when a style of reasoning is no longer used it is because of historically contingent reasons rather than rational ones. The “spaces of possibility,” to use the earlier term, have changed to favour another style

Just as the world of Austin Powers is propelled by historically different styles, each with their own logic and accompanying objects, so I will argue now, is the world of economic geography. It has been a discipline beset by a war of styles, and no more better represented by the rupture between 1960s spatial science and 1990s “cultural turn.”

The 1960s Science of Space versus the Millennial Culture of Place

Economic geographers did not invent the style of reasoning that characterised spatial science, and which dominated the subject from the mid-1960s. They certainly stamped it with their disciplinary concerns, though. That style derived primarily from the tradition of (Galilean) theoretical modelling (one of the six styles of scientific reasoning Hacking names). That style is defined by a belief in a core language that represents the essential features of the phenomena investigated. By essential features is meant those inviolate characteristics that define a phenomenon. In turn, the core language possesses four properties. First, it is mathematical because “mathematics is nature’s own language,” as Galileo put it. Second, it is delineated by precisely defined concepts, and which are connected by pre-established inference rules. Those rules allow the relationships among phenomena to be represented as necessary truths derived from logic, rather than as serendipitous connections. Third, the core language is always the bedrock of explanation. No matter how variegated and chaotic phenomena appear to be on the surface, once they are reduced to the core language, they become ordered and explained. Finally, the empirical world is connected to the core language because it shares the same rational logic. As a result, the relationship between the core language and the world is an objective one, set by a higher guarantor of truthfulness, rationality, and uninfluenced by the values and biases of the investigator.

When North American economic geographers first launched what was known as “the quantitative and theoretical revolution” in the late 1950s (Barnes, 2000, 2001) they deployed a Galilean style of scientific reasoning focussing on space. The focus on space (as opposed to place) was inherent within the style of reasoning they practised, and clear by running through the above four features as they applied to 1960s economic geography. First, spatial science was resolutely mathematical; it was the “final vocabulary” (Barnes, 1996, ch. 6). For example, in an early statement, one of the founders of spatial science, Garrison (1956, 428), called mathematics “the universal language.” Moreover, in the form of geometry mathematics was the language of space. No wonder that Haggett (1965, 15) in his important spatial science text, Locational Analysis in Human Geography, encouraged economic geographers to make use of the hitherto “neglected geometrical tradition.” Second, spatial science’s use of precisely defined concepts

and their logical relation was undertaken by drawing upon pre-existing theory, frequently taken from physical science, and which was often already set in geometrical space. The best-known example is economic geography's use during this period of spatial interaction models, all derived from a Newtonian physics that accentuated space and a Galilean style of scientific reasoning. Third, mathematical, and in particular, geometrical axioms, were used by spatial science as a bedrock to explain economic geographical diversity and variety including the existence of seeming unique places. For example, Haggett (1965, 118-19) uses Berry's work already cited on central place systems in South-western Iowa to show that that while places like Council Bluffs, Red Oak, and Glenwood, all settlements in the region, might appear as the consequence of serendipitous forces, their geographical order and explanation in fact stem from "higher order geometries" (Haggett, 1965, 15). Finally, mathematics ensures objectivity. Because mathematics and geometry are carried out using a common set of rules, and with proofs open to general scrutiny, no personal, value-laden judgements are possible. For Haggett this was one of the important reasons for deploying those "higher order geometries." The explanation of Council Bluffs, Red Oak, and Glenwood, does not depend upon subjective description, personality-of-place studies, of the kind dominating economic geography before spatial science (Barnes, 2000). Rather, explanation was consequent upon rigorous, independent procedures that by their very constitution as a core language denied personal bias and predilection.

If spatial science represents a particular style of scientific reasoning, then it should also conform to the two features of self-authentication as defined by Hacking. Certainly, the first feature, establishing criteria of truth and falsity, is present. Following the Galilean tradition, spatial science upholds that any element of the world representable in terms of the core language of mathematics, such as space, is a candidate for truth or falsity. For example, it will be either true or false that once suitably transformed the spaces of Southwest Iowa conform to the "higher order geometries" of central place theory. In fact, establishing the truth or falsity of that proposition was the principal purpose of Berry and Barnum's (1967) paper. In contrast, other features of the world, say, unique places, will not be candidates for truth or falsity, because they cannot be mathematically represented. They are epiphenomena, entities that appear real but are not. Similarly, the second feature, the creation of new objects of inquiry, is also found in spatial science. Created by spatial science were: new objects such as punch cards stamped with spatial data, or plotters for drawing computer-based maps; new evidence such as survey data on consumer travel behaviour, or tables of cost and price data for the iron and steel industry; new sentences for bringing forth candidates for truth and falsehood such as regression lines, or linear programming equations, or diagrams of bid-rent curves, isodapanes, and nested hexagons; new laws such as Tobler's (1970, 236) First Law of Geography that "everything is related to everything else, but near things are more related than distant things;" and new possibilities such as making economic geography into a legitimate social science.

The combination of these two features, in turn, makes spatial science self-authenticating. The novel spatial world it conjures up exists because of the very style of reasoning in which it is expressed; it makes such a world possible. But as Hacking is keen to emphasize such an assertion represents neither idealism, nor subjective relativism (Hacking, 2002b, ch. 1). Styles of reasoning emerge only if there are appropriate "spaces of possibilities," and which are suffused by material relations, and illustrated by Hacking (2002b) and Poovey (1998) in the example above of the invention of induction and fact making in late seventeenth century Europe. For

reasons of brevity, I cannot provide an account of the spaces of possibility that enabled economic geography to adopt the Galilean scientific style from the late 1950s. In other papers (Barnes, 2000 & 2001), however, I give a detailed assessment, and which turns on a broad set of factors operating in the post-Second World War period. They include a Panglossian view of science and technology, a move within especially American social sciences to quantification and mathematisation and prompted in part by Cold War concerns, and an reliance on instrumental rationality to solve practical urban and regional problems brought about by an increasingly “affluent society.” The point is that styles of scientific reasoning are not spectral, appearing out of nowhere, but are always tethered to contingent historical circumstances.

Let me turn now to the other style of reasoning associated with the “cultural turn” that becomes dominant in economic geography sometime in the 1990s, and stresses place rather than space. Before doing so, though, I need to address the fact that as a style the cultural approach is not on Hacking’s list, and some would deny that it is a form of scientific reasoning at all. While Hacking doesn’t discuss the cultural approach, he does at one point write about witchcraft as a style that once had credibility but no longer does (Hacking 2002b, 194-5). If witchcraft can be a candidate for a style of scientific reasoning, then surely the cultural approach can as well. More importantly, the issue is less whether the cultural approach is on Hacking’s original list than whether it exhibits self-authentication, and which for Hacking is the defining characteristic of a style of scientific reasoning. I will argue it does, but first let me discuss the kind of style the cultural turn represents.

In many ways, the cultural approach is the antithesis of the Galilean tradition, denying both essential features of phenomena, and a privileged vocabulary of representation. Indeed, each of the four features of the Galilean style I outlined above has its mirror opposite in the corresponding characterisation of the cultural style. First, for the cultural approach mathematics is not a final vocabulary because it is predicated upon a set of historically embedded assumptions that make it always a partial lexicon (and seen in Hacking’s 1990 own history of statistics). More generally, once one denies reality possesses foundational essences, the very idea of writing an “accurate representation” is called into question, thereby necessitating an array of representational strategies and not a single one. Second, a cultural approach shuns the notion of precisely defined categories and a singular deductive logic in favour of blurred categories, and a non-linear reasoning. Knowledge is acquired often by metaphorical leaps that by their nature smudge concepts, and shuns the p’s and q’s of formal logic. Third, rather than reducing explanation to single bedrock entities, the cultural approach deploys non-reductionist strategies to uphold messiness and contingency. Finally, the idea of objectivity as the view from nowhere is rejected by the cultural approach in favour of the idea of situated knowledge, the notion that knowledge is always from somewhere.

In turn, these four features of the cultural approach have come to define the cultural turn in economic geography. But just as the Galilean style emphasized space, the style of the cultural approach emphasizes place. First, by problematizing mathematics, and relying on only words, makes it difficult to represent abstract spatial relations. Place is much easier to portray. This is exemplified in Doreen Massey’s (1984) Spatial Divisions of Labour, which offered the first explicitly cultural approach to economic geography (Barnes, 2003). Ironically, though, given its title, it was primarily a theory about the constitution of place, and represented by the sedimentary

metaphor of layers of investment upon which Massey drew. Second, issues of hybridity and metaphor pervade the cultural approach in favour of definitively defined concepts and syllogistic reasoning. Indeed, as I suggested in the introduction the very project of the new economic geography is to hybridise economy and culture. But it is argued that where this is best seen is in particular places. For example, in McDowell's (1997b) work on finance, and which is scrupulous in upholding culture-economy hybridity, the focus is resolutely on a single place, the City of London, and not the wider abstract spaces of money that the City also produces. Third, the move to non-reductionist forms of explanation implies the eschewing of grand theory bent on uncovering essential explanations. The cultural style emphasizes contingent context, and which is irreducible. For example, Schoenberger (1997) argues that reductionist neoclassical economic theory couched in terms of universal maximization principles cannot understand corporate decision-making. Rather, understanding only follows from appreciating the peculiar corporate culture of the firm, and which like all culture, is rooted differently in different places. So, to comprehend why Xerox missed the opportunity to capitalize on its PC development of the early 1970s, one must appreciate the different cultures operating between its Head Office in New York, and its R&D labs in California. Finally, the shift in economic geography from objectivity to situated knowledge, is reflected in much greater self-consciousness in terms of writing style, authorship, and most germane here, the author's location. Rather than assuming as spatial scientists did that their method is a view from nowhere, cultural economic geographers recognise that their view is always from somewhere, and as a result, their location, their place, requires explication. Gibson-Graham (1996), for example, preface their book with a discussion of who they are and which has everything to do with where they have been.

If these are the features that characterise the cultural style of reasoning in economic geography, are they able to meet Hacking's criteria for self-authentication? The first feature, setting the means for determining falsity and truthfulness, is difficult to meet because words like truth and falsity and their criteria of meaning are not formally defined within the cultural style. That said, clearly not anything goes. Works within the cultural approach are making claims about the world, asserting that unless reference is made to the cultural, the account is inadequate. While adequacy and inadequacy maybe not be equivalent words to truth and falsity, they produce similar effects, legitimating discussion about the merits of particular place-based cultural research such as Massey's, McDowell's, Schoenberger's, and Gibson-Graham's, and excluding space-based spatial science such as Berry's. The second feature is easier to show. A culture-based economic geography is all about creating new objects of inquiry turning on the recognition of the culture-economy hybrid. New objects such as software programmes for textual analysis are created, new evidence such as in-depth qualitative interviews and reflexive accounts of the interviewer are produced, new sentences drawing upon terms like performance, disciplinarity, and hybridity are fashioned, new modalities like economic geographical knowledge as situated knowledge are averred, and new possibilities such as that economic geography is a branch of cultural studies are supported.

As before, the combination of both these features makes the cultural style self-authenticating. The style itself brings into view, and justifies as a subject, the place-based culture-economy hybrid, just as spatial science did the same for the space economy. In both cases, there is no higher standard or authority than the style itself. The style produces the substance, bringing forth new objects never seen before, and new sentences never said before. But again, to use Hacking's

(2002b) term, the ontology created is historical stemming from the contingent spaces of possibility that emerge. While there is no work within the new economic geography that identifies those “spaces” that give rise to it there are some obvious candidates: the changed character of work increasingly found in the service section, and the changed character of class shaped as much by cultural as financial capital; the changed character of politics that has moved away from traditional class-based antagonisms to culturally determined ones such as around gender, race and sexuality; and the changed organizing principle of the economy that has moved away from brute power and materiality to discursive construction (discussed by Lash and Urry’s 1994 in “economies of signs,” and by Beck 1992 in “reflexive modernization.”) This is a crude listing, but goes to a point made by the cultural approach itself: knowledge is always situated, even knowledge that advances the thesis of situated knowledge.

Conclusion

In a wonderful geographical turn-of-phrase, Althusser (1972, 85) says that Thales “discovered the continent of mathematics.” That is what a style of reasoning achieves: it opens up territory not seen before, producing possibilities no one has yet imagined. Spatial science and the “cultural turn ” discovered new continents, such as in the first case, nested hierarchies of hexagons on isotropic spatial plains, and in the second, firms embedded in thick social and institutional relations within particular places. Before their “discovery,” these worlds were not known; but afterwards, they produced all kinds of new possibilities such as Berry and Barnum’s work in Iowa or McDowell’s in the City of London. In each case, though, as I’ve argued following Hacking, these styles, these continents of work, are self authenticating, denying “independent criticism because the very sense of what can be established by the style depends upon the style itself” (Hacking, 1985, 155). The consequence is that styles of reasoning rise and fall not because of rational refutation, but because of contingent historical factors.

I tried to point very briefly to some of those factors in the paper, at least those that contributed to the rise of both styles. With respect to decline, it is clear that spatial science is on the wane now at least in Anglo-American geography. But it is not because the cultural approach offered an irrefutable argument against it. Rather, decline came from changing spaces of possibilities that favoured the cultural approach and turned against spatial science. The implication, though, is not that spatial science should therefore be thrown into the intellectual dustbin of history; yet one more dead paradigm. To think that is to fall into the rational progressivism that the very notion of styles of scientific reasoning seeks to undermine. In fact, spatial science’s emphasis on calculative space seems immensely relevant to the current global system driven precisely by calculations about space. In trying to think though how emphases of different styles might be combined – in this case, incorporating spatial science’s focus on space with the “cultural turn’s” stress on place – the work of another writer in science studies, Galison (1998), is useful. He is interested in the “trading zone” that exists between two different styles of reasoning. That notion of a trading zone he takes from the development of “Creole” or “pidgin” languages that are developed to facilitate social and commercial interchange between two different language speakers. Finding the trading zone between spatial science and the cultural approach should be the goal in economic geography; as an intellectual tradition it requires both space and place. But such a task will be hard, and evident even in the Austin Power movies. But in the end, Austin Powers negotiates between 60s talk of “Oh, Groovy Baby” and 90s talk of political correctness.

Economic geography needs to make the same negotiation in which case as in all Hollywood movies there will be a happy ending.

Bibliography

Althusser, L. 1972 Politics and History: Montesquieu, Rousseau, Hegel, Marx. London: New Left Books.

Barnes, T. J. 1996 Logics of Dislocation: Models, Metaphors, and Meanings of Economic Space. New York: Guilford.

Barnes, T. J. 2000 Inventing Anglo-American economic geography: 1889-1960. In E. S. Sheppard and T. J. Barnes, eds, A Companion to Economic Geography, pp. 11-26. Oxford: Blackwell.

Barnes, T. J. 2001 Retheorizing economic geography: From the quantitative revolution to the “cultural turn”. Annals, Association of American Geographers, 91, 546-65.

Barnes, T. J. 2003 Never mind the economy. Here’s culture. In K. Anderson, M. Domosh, S. Pile, and N. J. Thrift, eds, The Handbook to Cultural Geography, pp. 89-97. London: Sage.

Beck, U. 1992 Risk Society: Towards a New Modernity. London: Sage.

Berry, B. J. L. and Barnum, H. G. 1967 Aggregate relations and elemental components of central place theory. In R. H. T. Smith, E. J. Taaffe, L. J., King, eds, Readings in Economic Geography: The Location of Economic Activity, pp. 302-7. Chicago: Rand McNally.

Casetti, E. 1967 Optimal location of steel mills serving the Quebec and Southern Ontario steel market. In R. H. T. Smith, E. J. Taaffe, L. J., King, eds, Readings in Economic Geography: The Location of Economic Activity, pp. 340-9. Chicago: Rand McNally.

Galison, P. 1998 Image and Logic. Cambridge, MA: Harvard University Press.

Gibson-Graham, J. K. 1996 The End of Capitalism (As We Knew It). Oxford: Blackwell.

Hacking, I. 1985 Styles of scientific reasoning. In J. Rajchman and C. West, eds, Post-Analytic Philosophy, pp. 145-65. New York: Columbia University Press.

Hacking, I. 1990 The Taming of Chance. Cambridge: Cambridge University Press.

Hacking, I. 2002a Inaugural lecture: Chair of Philosophy and History of Scientific Concepts at the Collège de France, 16 January 2001. Economy and Society, 31, 1-14 (translated from French by I. Hacking).

Hacking, I. 2002b Historical Ontology. Cambridge, MA: Harvard University Press.

Haggett, P. 1965 Locational Analysis in Human Geography. London: Edward Arnold.

Hess, D. J. 1997 Science Studies: An Advanced Introduction. New York: New York University Press.

Huntington, E. 1924 The Character of Races as Influenced by Physical Environment, Natural Selection and Historical Development. New York: Charles Scribner's Sons.

Kuhn, T. 1962 The Structure of Scientific Revolutions. Chicago: Chicago University Press.

Lash, S. and Urry, J. 1994 Economies of Signs and Space. London: Sage.

Lee, R. and Wills, J., Eds, 1997 Geographies of Economies. London: Arnold.

Massey, D. 1984 Spatial Divisions of Labour: Social Structures and the Structure of production. London: MacMillan.

Massey, D. 1997 Economic/non-economic. In R. Lee, and J. Wills, eds, Geographies of Economies, pp. 27-36. London: Arnold.

McDowell, L. M. 1997a A tale of two cities? Embedded organizations and embodied workers in the City of London. In R. Lee, and J. Wills, eds, Geographies of Economies, pp. 118-29. London: Arnold.

McDowell, L. 1997b Capital Culture: Gender at Work in the City. Oxford: Blackwell.

Poovey, M. 1998 A History of the Modern Fact: Problems of Knowledge in the Sciences of Wealth and Society. Chicago: University of Chicago Press.

Schoenberger, E. 1997 The Cultural Crisis of the Firm. Oxford: Blackwell.

Smith, R. H. T., Taaffe, E. J., King, L. J., Eds, 1967 Readings in Economic Geography: The Location of Economic Activity. Chicago: Rand McNally.

Taaffe, E. J., Morrill, R. L., and Gould, P. R. 1963 Transport expansion in underdeveloped countries. Geographical Review, 53, 503-29.

Tobler, W. 1970, A computer movie simulating urban growth in the Detroit region. Economic Geography, 46, 234-40.