

Filling in the Blanks: Translating among Systematic Geographies

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Abstract

This article offers an approach to integrating systematic geographies by translating among them. First, a distinction is made between integration and synthesis, the former highlighting the relations among geographic subdisciplines, rather than an amalgamation of them. A matrix to be used in pursuit of this integration is then proposed and compared to other models of geographic integration and synthesis, namely region, place, landscape, and network. An in-depth discussion of the relational aspect of the model follows. The semiconductor is offered as a model of an individual relation between two subdisciplines. The concept of the parasite is then introduced as a metaphor for a wide range of human, biological, and physical actors that influence these relations. The article closes with a discussion of grammar that further expands the relational concept, particularly through the use of prepositions. Key concepts are adapted from the work of Michel Serres.

Integration

GEOGRAPHIC KNOWLEDGE as pursued via systematic investigation has never been more profound, but these subfields largely remain philosophically, methodologically, and institutionally separate, and in their isolation are limited in their power to explain geographical phenomena and processes in all of their complexity. The need to braid the subfields into a more interconnected form is currently well recognized (Cloke and Johnson 2005; Harrison et al. 2004; Gober 2004) and has been an ongoing debate within the discipline (see Freeman 1986; Goudie 1986; Graham 1986; Johnston 1986; and Taylor 1986 for one exchange). With both a growing need to understand the world in its complexity and the development of geographic information science, the call for geography to take an "integration turn" has never been clearer nor more answerable (Hoekstra 2005).

Systematic geographies that focus on culture or economics, on land-forms or life-forms, are essential to the discipline and fascinating in their depth and detail, but they do not demonstrate the field's

breadth and capacity for integration. The development of systematic investigation has moved the discipline from one primarily concerned with describing distinct geographic regions to one adept at theorizing distinct geographic processes. The idea of a distinct geographic process, however, is now recognized to be as problematic as the regional concept (Cloke and Johnson 2005). Economy, politics, society, and culture are perhaps more correctly understood as just aspects of human activity rather than as distinct activities in themselves. Buying a house, for example, has cultural, social, and political dimensions as well as economic ones. As for the natural environment, the lithosphere, hydrosphere, atmosphere, and biosphere may be more accurately characterized as interactive components of the physical world rather than independent processes (Wilkinson 2006). Additionally, all of these processes and interactions among them occur over time and are subject to technological intervention.

Geography has the capacity to contain these myriad functions and chart their mingling, by virtue of its variegated structure with space as its milieu. Within the discourse on nature-culture, it has begun to close the physical/human gap. Other epistemological gaps, such as that between culture and economy, need to be narrowed, however (Barnes 2005), while others should be made wider, such as that between culture and society (Gregson 1995). The practice of hyphenating these binaries into forms such as socio-cultural is more a surrender to the ambiguous or unknown relationship of the social to the cultural than it is a subtle expression of it. The intuition that produces these combinations is correct, but the hyphen needs to be both more informed and more informing, and wrought to fit the particular manifestations of the processes as they occur in specific periods and places (Serres 1995).

A common understanding of the creation of the European Union is that supranational integration is facilitated by each nation retaining its own distinct cultural and historical identity, secured in practices such as language, art, and tradition, and symbolized by sites and monuments. Once national identity is established and safeguarded, connections and concessions can then be made concerning contemporary economic, political, and social activities (Dinan 2004). This is hard to do because the processes are entangled, but it still seems possible to make useful and valid distinctions among them. Strong national cultures do complicate the process of building strong supranational cultures, however.

The project of integrating geography would benefit from similar distinctions being made among its subfields, because only then can the bridges between them be accurately and usefully modulated. For this reason, I prefer the word “integration” over “synthesis.” An integration of geography calls for clear connections being made between distinct subfields to create an articulated epistemology, whereas synthesis implies a blurring of these distinctions to form an amalgamation. The discourse that problematizes the relationship between two ontological and epistemological spheres, nature and culture for example, is enlightening and useful, but perhaps the discussion of these binaries would be better served by cleaving and then explicitly reconnecting them (Puleo 2007).

An integrated approach differs from four synthesizing discourses in geography—region, place, landscape, and network—in its privileging of relations over phenomena or process. What follows is the briefest of commentaries on these four concepts, each of which has long embraced the task of synthesizing spatial data, to give just a slight indication of some past approaches.

The region was a central unit in a number of geographic projects including chorology, exploration and colonization, *terroir*, spatial science, and locational analysis. As such, it was always conceived as an object that was both partitional and aggregative. Regions were building blocks that could be divided or put together to make larger or smaller units (Gregory 2000). The synthesis of phenomena and processes within them was the mode of creating them, making the project one more of amalgamating an object (Hart 1982) rather than striking an informed and informing relation among processes. The various approaches to formulating and representing regions have been criticized for being incomplete, reductive, and biased, but the model persists because, as murky and riddled as they are on the ground, regions retain a firm grasp on the geographic imagination. We may not know exactly where Appalachia is, but we know without doubt that it exists and have at least some accurate ideas of what it is like, and describing it and other regions remains a valid and important project within the discipline (Gregory 2000).

A number of these difficulties found some resolution in the discourse on place in which subjective engagements with space (identity, attachment, meaning) were mated with more objective spatial understandings (Entrikin 1991), thereby pitching the concept somewhere between the two poles. Other approaches to the concept posited a

three-part, multi-scalar model in which an intermediate realm of informal social interaction (locale) mediates the interaction between subjective engagement (sense of place) and geographical setting (location) (Agnew 1987).

Landscape interpretation underwent a similar expansion under the discipline's cultural turn. The standard approach of the 1950s developed by Carl Sauer relied upon the observation of surface artifacts to reconstruct histories of human impact. Innovative work on landscape conducted in the 1980s and '90s revised this method by considering the social, cultural, and political contexts of landscape representation as "a way of seeing" (Cosgrove 1984).

The network concept has been conceived as infrastructural, administrative, informational, and social linkages. It has been central to the globalization and supranational regionalization discourses, and yet the strands have been kept largely separate because of the philosophical, methodological, and institutional divides mentioned in the opening of this article. This separation is not without good reason, since a study of just one type of network is a daunting task in itself; the braiding of the various streams overwhelms most theoretical approaches. Nevertheless, some theoretical gains have been made in hybridizing products and activities such as the cultural and the economic (Barnes 2005; Cresswell 1996). Conceptual binaries such as culture-economy offer some promise as dynamic units that can be further combined to form a larger complex. To do this, some kind of fertile structure is needed, some kind of matrix.

Matrix

Matrix is a marvelous word that is a core concept in several academic disciplines: anatomy, biochemistry, botany, computer science, electronics, geomorphology, logic, mathematics, photography, and recording, to name most of them. Originally it denoted a female domesticated animal to be used for breeding. I use it to mean not a theoretical framework but a way of holding multiple geographical processes in relation to each other. It does not provide content, only shape. Therefore it is compatible with any theoretical perspective and ideally calls for the use of multiple theories to explain each relationship between a pair of functions such as culture and politics, economy and land, water and biosphere, and so on. As a means of spatially organizing data, spreadsheets are useful but may be too rigid and constraining in the early stages of an investigation. Their use dampens the observer's intuition, curiosity, and naïveté: facul-

ties from which the most inventive and original insights spring (Serres 1995).

Brian Berry's seminal "geographical matrix" is one such spreadsheet that uses rows to log places and columns to note phenomena (Berry 1964). Once a matrix is complete, the area can be studied in two ways. Looking across a phenomenon row would indicate spatial variation; this could be mapped. Looking down a place column would reveal a spatial association; this could be synthesized. Each spread sheet would represent a particular slice of time, so that a series of such spread sheets could be used to capture temporal variation to imbue the spatial variation with historicity (Berry 1964). This method was a response to the overwhelming task of organizing the massive amount of detail that is gathered even in a single glance. The synthesizing process was left unspecified and, as with all spatial analytic methods, there was no accounting for subjectivity.

Spider diagrams are more flexible. The combination of circles, lines, and words is directional yet flexible. I start every investigation by using one, move later to spreadsheets, and then later still move to a word-processing program to type out a more-detailed outline. The geographical matrix is a more rigid kind of spider diagram that also has built in geographic prompts that facilitate a methodical approach. Without the prompts, it would be possible to overlook a particular process that may not be immediately or strongly evident. Data and other thoughts about the place or event under investigation is not limited to on-site observation but can be derived from any source. Much of its design is derived from Nevin Fenneman's concept of geography cited earlier (Fenneman 1919). By using the framework of matrix-spreadsheet-word processing program, the move from phenomena to observations to words is done gradually so that a clear focus is maintained on the relations among geographic functions. Bruno Latour describes the step-by-step practice of science in a similar way of transforming places into sentences and data sets, one which he describes as being characterized by doubts, difficulties, and compromises (Latour 1999).

The matrix proposed here contains 10 functions that represent common disciplinary subfields: economy, politics, society, culture, history, land, water, atmosphere, biosphere, and technology (Figure 1). Geographic phenomena and processes such as cities and agriculture are compounds of these functions. An investigator selects the functions needed to investigate a particular place or event and

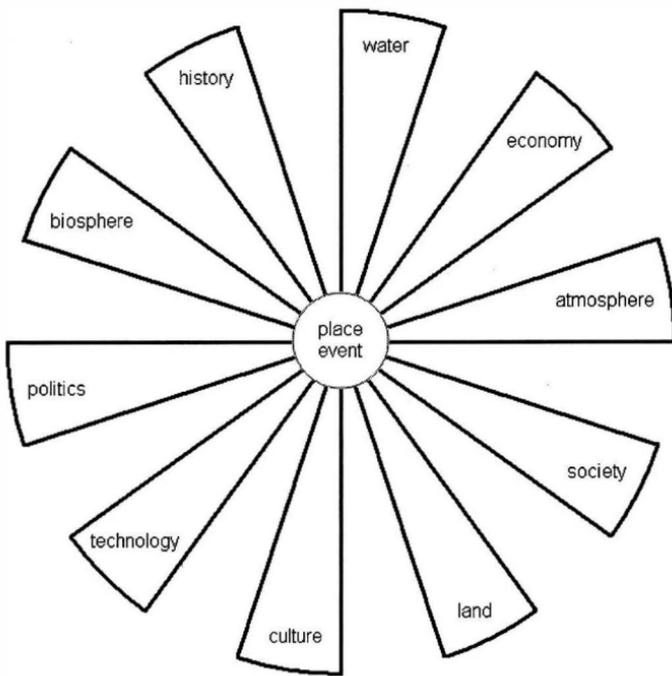


Figure 1.—A 10-function, integrating geographical matrix, for place/event investigation.

connects them in a way that leads to the best explanation of and story about the thing in question. A total of 45 functional pairs are possible: economy and water, economy and politics, and so on, eliminating the identical (economy and economy) and repeating (economy and politics, politics and economy) pairs. Not all of the components have to be used—only those that are relevant to the study. Function definitions are variable according to the philosophical, methodological, and theoretical formation and needs of the investigator.

It is not only the multiplicity of functions that allows for a fuller and more-accurate investigation, but also the multiplicity of ways that these different functions can be held in relationship to each other. The arrangement of the functional data in the circular format of the matrix allows for the random movements made by the observer in response to the complex demands of geographic integration (Serres 1995). A place or event does not unfold linearly; functions must be visited repeatedly and intermittently as one function responds to another.

The ordering of the functions is determined not only by the observed features of the place or event but also by the subjectivity of the observer. The sequence can be constructed chronologically, listing the function that had initial impact, followed by subsequent functional reactions and interventions. Or it can be designed hierarchically, with the strongest function listed first and weaker or dependent functions following. Sometimes, within the sequence, it is impossible, undesirable, or unjustifiable to fix an exact sequence of functions. This ambiguity is expressed in the non-hierarchical grouping of the functions in the sequence and in the analysis and discussion about it. These decisions rely at least partly upon the independent judgment of the observer.

Relations

Serres often expresses his integrative perspective using geographical metaphors. The crossing of disciplinary boundaries, if not their erasure, is at the core of his thinking. His fundamental stance is that the world is a chaos and that any discernible patterns are rare exceptions. Synthesis, whether mental or material, is fragile and fleeting, relative to the general noise and confusion of the world. He describes knowledge as randomly appearing islands in a vast and unknown sea or to flames that dance before his eyes. To connect these forms of knowledge, the investigator must move with swiftness, intuition, and freedom. He likens the process to Hermes flying from place to place, to an explorer making his way through the tortuous Northwest Passage, or to a fly buzzing in a seemingly crazy pattern but in truth responding to its own internal logic and the specific features of its environment (Serres 1995).

Relations are all-important for Serres. He evokes mathematics as a sublime model that works equally well when applied to human as well as physical interactions. Quite understandably, he finds geometry and topology to be particularly useful in the study of the relationships of human and physical spatial phenomena. They offer a space of relations without numbers, however. For Serres, numbers are just markers of relations, like a rugby ball that is passed from player to player, tracing the invisible connection among them. The relations make the game and move the players; the ball is just a token on the game board. It lets the observer keep track of the activities on the field. The adept player is the one who sees the connections forming ahead of him, understands how to make them, and then makes them successfully. As in rugby, the connections among players

are oblique and difficult to follow, as they are by their very nature completed with feints and bluffs, and in an atmosphere of movement and chaos where signals are communicated with difficulty. This noise, however, is as much a part of the game as are the plays and players. The explication of these complex relations is the purpose of science and art, which he holds as identical ways of knowing that have been foolishly separated. The task of scholars is to put them back together (Serres 1995).

My own experience offers a simpler example. Beginning in the early 1990s and through to the early 2000s, I worked in property management and redevelopment in San Francisco. My understanding of how places are made, humanly and physically, is strongly influenced by what I observed while engaged in this work. Every project of making or remaking a place was a navigation or negotiation of multiple processes. Economic factors were important, but they were not always decisive and never did they act alone. Historical identity, political goals, cultural meaning, and social organization often had a say, and these various processes rarely combined in the same way twice. The same was true for physical processes. Fault lines, underground streams, microclimates, pigeons, and the technology that exists to deal with them, not to mention their intersections with human factors, all mattered in ways that were particular to every project. Sometimes a venture would fail, and it would always develop in unexpected and unintended ways. Each place was always a product of a particular arrangement of multiple processes, so using a single systematic approach or focusing on only one feature such as capital, identity, weather, or terrain could never yield a complete and accurate description and understanding of its development. These experiences have led me to value geography as the use of multiple systems to understand a particular place, rather than as the use of particular places, to understand a single system.

Semiconductors

If we accept this model of geography as one of subdisciplines that are characterized by varying ontologies and epistemologies that are related in some way, the next step is to understand the nature of these relations. One metaphor that Serres offers is that of the semiconductor (Serres 1995).

A semiconductor is a nonmetal solid material, commonly silicon, which has the capacity to act as either a conductor or as an insulator depending on its intrinsic or extrinsic condition. Two factors

can change this condition: heat and impurity. In an intrinsic semiconductor, there is a narrow gap between the valence (insulating) and conductive bands in the material's crystal lattice. When the semiconductor is thermally excited, electrons gather enough energy to leap the gap between the valence and conductive bands and conduct either heat or electricity. In an extrinsic semiconductor, the conductive process is facilitated by the introduction of an impurity into the semiconductor material's crystal lattice. This impurity permanently narrows the gap between the bands and increases the semiconductor's conductivity. This process is called doping, and it allows the conductive capacity of semiconductor material to be changed permanently via an external means, or extrinsically. A semiconductor that has been overly doped to the point where it is almost always a conductor, even at room temperature, is called a degenerate (Yu and Cardona 2005). This use of human metaphors to describe an engineering concept shows how mixing across disciplines already exists.

As a metaphor for the relation between two geographical processes, the semiconductor has rich potential. Let us take as an example the relation between land and economy. If land is infertile, it cannot be used to grow crops that could support a population. One could say that the relation between land and economy is very much in its insulating mode, as there is no positive dynamic between the two systems. (Alternatively, you could say that the infertile land positively prohibited the raising of crops and was therefore in a conductive mode, but this would be an atypical human perspective.) Some factor would have to be introduced to change the relation from insulating to conductive; something would have to heat up or contaminate it somehow. Something or someone would have to act upon the relation to change its state. What could that be? Serres switches disciplines, moving from electrical engineering to biology to provide an answer: the parasite (Serres 1995).

Parasites

In French and other romance languages, a parasite has three forms: social, biological, and physical. The first two forms are the same as in English: the social parasite is someone who takes something for nothing; he invites himself to dinner and does not bring a bottle of wine. He thinks his own noisy company is payment enough. Similarly, a biological parasite invades its host's body. It derives nourishment from the host and gives nothing in return. Often it

hurts the host (but does not kill it) or changes the way it functions, so that it derives the greatest possible flow of nourishment (Combes 2005). The third type of parasite is unknown in English; this is the physical kind: static, noise. If the static on a cell phone connection interrupts the conversation, it is a parasite. This meaning exists in English in the sense that a computer can become infected with a virus, or more colloquially and generally, there can be a “bug in the system.” But in French, *le parasite* is all three: social, biological, and physical, and it attacks in three ways—by bankrupting, interrupting, or corrupting its host. This is “the logic of the parasite”: analyze (take without giving), paralyze (stop the host from functioning), catalyze (cause the host to act differently) (Brown 2002).

But what does the parasite have to do with the semiconductor? The parasite, says Serres, is “nested on the relation (Serres 2007).” If the relationship is a semiconductor, it is sensitive to heat and contaminants: heat on and the electrons pass; heat off and they are kept isolated. Dope the material and the message passes along the wire. Parasites are thermal exciters and polluters. As biological infections, they cause fever. As talky guests at the dinner table, they warm the host with their charm. They are also catalysts, agents that facilitate a reaction. Parasites, in nature as in society, are clever, inventive, and dynamic. They find the gap and fill it. They make the connection.

Back to our fallow field: it is not dynamic, nothing grows in it and it does not support a population. Someone, a parasite, finds ore or oil there, which can now be traded for food. Or perhaps it is fallow because it is contaminated by hazardous waste. One kind of microbe might be able to metabolize that waste. Perhaps there is no water; the parasite builds an aqueduct. The parasite is the third element that causes the relation, and which is the relation, between land and economy that did not exist before. It is inventive. It sees opportunity where others see failure (Serres 2007).

Grammar

So far we have a mixed model of a relation—the semiconductor—and of an agent that causes this relation to turn on and off—the parasite. But we are probably correct in assuming that the relations among diverse subdisciplines will also be diverse. Just as parasites are adapted to specific organs in their hosts’ bodies—the heart, the brain, the gills—so too are the relations among various subdisciplines and the parasites that create and influence them. To address this variability, Serres goes to another discipline: linguistics.

“Between” is an important word for Serres (1995), as is for Entrikin in his discussion of place, and more obliquely for Agnew and Cosgrove, who emphasize the role of mediation and imagination in geographic construction and perception in their conceptualizations of place and landscape. The part of speech that serves this mediating function in language is the preposition. Like parasites, they are highly specific to their environment. When used in a sentence, the prepositions “to,” “at,” and “for,” for example, have different meanings, depending on the words and phrases that they mediate. And they radically change the relationship among subject, verb, and object. Did you speak to, at, or for him? Deceptively small, prepositions serve as vital, variable, definitive, and content-rich links among the parts of a sentence.

They would be similarly effective as links between two geographic subdisciplines, as well as between geographic binaries in a chronological or hierarchical explanation of a particular phenomenon or process. The preposition forms the relation that translates between single functions (culture-economy) as well as linked binaries (culture-society—land-economy). By informing the hyphen that links the single or paired functions, one constructs an outline that can then be turned into a narrative that is held together not by a mute hyphen, but by an informative preposition. There are approximately 150 prepositions in English, allowing for a rich and promising number of configurations of geographic phenomenon and process.

An Example: The Drought in Southeastern Australia

I end with a brief application of the approach I have just described. Under investigation is the drought in Australia’s Murray-Darling Basin, as described in a brief newspaper article (Marks 2007). It is an event that is common to California and an increasing number of places in the world, due to increasing population and climate change.

Immediately apparent is that even a 1,139-word article produces a bewildering collection of observations that can be combined in an unlimited variety of ways. The sequence that an investigator adopts depends on the question asked, but even then the permutations of the data are unlimited because one reaction always leads to another until either the end of time or the collapse of space, neither of which seems imminent. But there is still much to be derived from the exercise, because the goal is not an exhaustive and definitive geographical history of the drought, which is impossible, but the

successful linking of functions in their particular detail and within a given sequence.

For example, if we decide to order the functions as atmosphere-water-land-biogeography-economy-technology-history-politics-culture-society, we could offer the following explanation of the drought: Less rain led to a reduction in groundwater, which made the land less fertile. The resulting decrease in agricultural productivity has historically been mitigated by irrigation, but unprecedented conditions require new water-management policies. Australia's then-prime minister John Howard has offered only words of encouragement, however. Land, livelihoods, and hope are being lost and people are killing themselves because of it.

Space does not permit the construction of a more-complex model of linked binaries, but simply by making pairs within the sequence of single functions, one can easily construct a more-complex and accurate scenario.

The sequence begins with atmosphere and ends with society, but the argument being made is not deterministic, even given a linear sequence. The effects are contingent and depend upon the particular time and space characteristics of the drought. These contingencies would be more apparent in a model that would extend both linearly, preceding atmosphere and following society, and laterally with offshoots that intersected and informed the sequence, turning it from a one-dimensional line into a two-dimensional model.

Particularly interesting is the fact that climate change is now occurring so quickly that it is easily perceptible within a single lifetime or even a few years; climate now changes over time in addition to changing over space. Such a development moves a discussion of any relationship between climate and society away from the environmental determinist and colonial discourses and toward an investigation of climatic and social changes as they occur within the same population and in the same place as they are mediated by other processes over a short period of time.

Does culture come before or after politics? Maybe culture exists around politics, and not only politics but also economy and society, as well as physical processes, seeping into the interstices, rooting in the cracks? Or might it be economy or politics, or a concatenation of processes that holds this position? Is geomorphology underneath

it all? Is climate above everything? Does hydrology run through not only soil, but society and culture as well? Is water, which may become more precious than oil, simply in everything? Is it not already? We use prepositions to indicate relations. Any theory of relations must take serious note of them.

Closing Thoughts

Single-function geographies are excellent for making the theoretical tools that have raised the practice of geography up from mere description. Geographies of economy, politics, society, culture, and history, and those that focus on land, water, climate, life-forms, and technology, are sciences in themselves. But in addition to further deepening our understanding of these processes, it would be useful to start linking them back together again to accurately represent and interpret the complexity of a particular phenomenon or process.

Theories about human-environment interaction are very useful, but they can go only so far in describing and explaining particular situations. The constitutive processes of a place or event are specific, and any data reflects this particularity even though it may conform to a general type. A theoretical framework that is built in response to the needs of particular data, and which is a synthesis of multiple functions, will always be a more-nuanced and accurate representation of a phenomenon than one based on just one function, such as economics, culture, or climate alone.

The matrix provides a snapshot overview of the discipline's scope and method, or at least one conception of it. A discussion of the relation between each set of subdisciplines is described, interpreted, and integrated into a single geographical study. The result is an investigation that smoothes systematic data born of distinct epistemologies into a vernacular study that benefits from its wide embrace of related functions. Such a model enhances the narrative of geography as conceptually rich, uniquely integrative, and easily applicable. The integration of geography is an extremely complex but endlessly fascinating project, and one with a long tradition in the discipline. I intend this article as one very small contribution to the task.

Finally, I owe the inspiration of this idea to the brilliant work of Michel Serres, a true genius in the field of integrated study.

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