

A geographical theory of knowledge: towards a PhD proposal

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1 Prologue

At the last AAG meeting in New Orleans I was struck, more than by the extraordinary diversity of the discipline, by the degree to which so many subfields of Geography were not easily accessible (sometimes not even intuitively) from my personal perspective as predictable research areas. Take *dendrochronology* for example: at the conference there were five sessions only on that. From the joint perspectives of the behavioral student (myself), and two spatial statisticians (Kevin Konty and Dr. Stuart Sweeney), dendrochronology stood out, on the conference program alone, as an amusing realm of tree-rings studies which hid a web of concepts and ideas that might also define, or call for, a new way of life (on the humorous side of course, but not only from that, after all).

The second aspect of the conference that struck me was the serendipity of what could be gained from the social side of the meeting. Two students of physical geography, with more than a chance-level relationship with dendrochronology, joined the UCSB group for an evening in New Orleans just after our initial interest for that discipline was revealed to us. The research phenomenology of one of the students was based on digging holes in the ground on a wind-swept area of Western Washington for soil analysis. The gap between our comprehension (in the widest sense of the term) and her research phenomenology was narrower at a system level: she was basically

researching the soil-vegetation relationship of *delay*, a concept or "primitive" so much abstracted from the wet ground to be different enough from the original, and thus more understandable to other geographers.

This latter example might seem to aim only at showing the need to communicate among geographers at system level by default - mainly to save time, and to be more effective; in reality the point I want to make is that I suspect that *delay* is the root of Gina's (one of the two students) phenomenological interests (which however are not the topic of this document). In other words, and generalizing a bit, the interest of the physical geographer for its "world" can be related to human roots, because *delay* is a human concept, rooted in daily experience, before being a systemic concept abstracted from phenomenologically-hostile environments. Why delay is accessed through a geomorphological phenomenology is a matter of personal epistemological preference, an aesthetical concept of synthesis of adaptability to a particular work dynamics and the characteristics of the specific set of phenomena, and previous experience, among other things. We might add that in the geomorphologist there might be the interest in the concept of delay when it goes beyond human scale: but, still, delay is originally learnt at human scale. In these considerations I haven't included the intellectual interest for the subject matter, which however most often can't buy you understanding from most of the other geographers not dealing with the same set of problems (except for those showing a general systemic interest - but not across a human-physical divide).

These two examples were enough to suggest me to write this document containing my research idea that might lead to a PhD proposal, and that basically proposes a rethinking of the organization of geography and knowledge in general. The two experiences worked as catalysts while providing enough content for me to be grounded somewhere. The idea is immediately summarized in the next section. while the following sections try to gather (entirely from memory) all the evidence and the viable strategies to support and pursue the idea. At this point, ideas might not be clearly referenced. I also suspect this idea is not strictly new but, rather, emergent, also considering the kind of informal feedback I received in so far, which has been as useful as the AAG serendipity.

2 A Geographical Theory of Knowledge

If the theory could be summarized in a sentence, this might be it: "*Geography can be structured using a particular system approach in which human-scale, or maybe even "cognitive", concepts or "primitives" are the fundamental organizing entities*".

I propose to structure our geographical knowledge around concepts like *delay*, *encoding/decoding*, *filter*, that have a systemic connotations but that are, most importantly, expressions of fundamental human scale (if not strictly "cognitive") processes - or at least, when considered at human scale, are relevant to a higher order.

Let's take *delay* for example: one type of delay is between insolation on a glacier and an increase in meltwater of the subglacial stream. I argue that humans are fundamentally interested to learn about the primitive of delay, and not usually in the phenomenology of the glacier *in isolation*, and therefore we should structure our knowledge around that concept, or "primitive". A human factors analyst in Geovisualization, in an example of redundancy in our discipline, would look for the "primitive" of delay in the phenomenology of the time it takes for a user to respond to a change in a GIS interface display. However, you don't see many geovisualization geographers reading about glacial geomorphology, or vice-versa, let alone exchanging references about the *Theory of Delay*.

Another way to consider this new re-presentation of knowledge is to think about a brand new discipline. The new discipline might be practised by *logicians* of delay, a "primitive" taken *in isolation*, defined as an ontology, and by the specific *implementers*, that is, those that study specifically the step through which the delay ontology becomes a glacial delay phenomenon, or interface feedback delay phenomenon, or even a romantic date delay phenomenon. The implementations would inform the logic, and the logic would inform the implementation.

I believe there are obvious advantages in structuring knowledge around knowledge "primitives" that arguably are what matters the most to human beings. On the utilitarian side it would decrease redundancy in the discipline and make sure that, for example, all delay-related research is up-to-date with the current status of delay research. From a more fundamental perspective, the structure of knowledge could be "realigned" by means of defining a knowledge "architecture" that reflects the human interest for human-scale information, instead of being a direct representation of reality.

It might also be researched whether the "primitives" of knowledge have a corresponding "form" in reality and if, in other words, a filter has ontological status.

Just to explain the previous considerations with an example, we might say that if we structure our knowledge of reality around the primitive of "delay", then all occurrences of delay in research are investigated at the same time by considering just the primitive, with great convenience. Moreover, instances of delay in glaciofluvial geomorphology would be recast into their fundamental human significance of delay as a "primitive". It might be said that this theory would be a human-scale reinterpretation (or, more precisely, re-presentation) of knowledge.

Finally, this theory is Geographical, but not strictly in a spatial sense. It might be argued that the primitives, and all the examples I mentioned in so far, come from a geographical background. However, the geographical nature of the theory is not only due to its sources of examples. Rather, I am thinking of it as an extension of GIScience in that the latter has a theoretical component and is interested in an implementation in database systems. The scope of the GIScience "architecture" might be extended by means of targeting not only database systems but the entire geographic knowledge base.

3 Sources

This project has not a clearly delimited research scope, and any pre-existing knowledge architecture, from Von Bertalanffy's General System Theory, to the ideas about meta-languages in Computer Science, to Philosophy (the original idea of the architecture of this theory comes from the Theory of Ideas of Plato, and his architecture of reality articulated in pure ideas becoming forms-in-reality) and Linguistics would all constitute a contribution to the "logic" layer. Cognitive Science in particular would provide a foundation for the cornerstones of the theory, in particular the human-scale (or cognitive) primitives around which the entirety of knowledge and experience would be structured. GIScience provides the integrated framework that already binds the diversity of approaches mentioned above, and makes the project feasible. The "implementation" layer might be based on carefully chosen areas of Geography that could be reinterpreted according to the logic-implementation differentiation. Paradoxically, although this theory might seem a push towards a more holistic study of the discipline, it is also a finer differentiation

between logicians and implementers, along the lines of Varenius's Geography based on differentiating *general* and *special* geography, which represents the fundamental process of separation that I am proposing again in my theory with the addition of the idea of "primitives" structuring knowledge.

4 Applications

A first application might be to help in reorganizing the discipline of Geography that is usually subject to centrifugal forces, considering the divide between human and physical geography in many European and American departments. It would be in the direction of a process of integration of such a diverse discipline. From an Education perspective, it would help in addressing the need for more abstract teaching and reasoning in the classroom, as well as a mean to integrate different content matters to contexts that are more relevant to the sphere of experience of the student (for example - taken to the extreme - seamlessly relating subglacial streamflow delay to a more experiential romantic date delay). However the most important advantage for developing, and adopting, the theory, would be to represent and develop *relevant* knowledge, in the sense of being tailored to the fundamental needs of human beings for human-scale information or "primitives".

5 Research Plan

I would like to expand this document into a PhD proposal, in particular outlining the structure of GIScience, conceptualizing the logic/implementation differentiation, and systematically referring such architecture to the current and past approaches used in Geography to represent reality (and/or knowledge). In order to characterize the approach I would consider specific case studies of conceptual redundancy in Geography that might be solved and redirected in a more powerful specialization of efforts.