Philosophical Issues in Geography—An Introduction

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Abstract. Geography presents interesting and intricate trade-offs between empirical data and demands, on the one hand, and deep philosophical issues (from ontology to political philosophy), on the other. What is a geographic entity? What is the relationship between a geographic entity and a physical territory? Can a geographic entity survive without a territory or without definite borders? Can it survive radical changes in its territory? Are there clear-cut identity criteria for geographic categories? This paper serves as an introduction to a special issue of *Topoi* whose aim is to go a first step towards a better understanding of these questions and of their implications for the theory of the geographic world.

The world of geography is extraordinarily varied. It includes mountains and rivers but also states and cities and voting precincts. It includes concrete parcels of land and water bodies as well as abstract fields of land-use and rain-fall. It includes natural topographic features such as bays, valleys, isthmuses, and promontories along with human-made artifacts such as dams, bridges, roads, railways, mountain passes. It includes naturally demarcated regions such as Australia or the island of Malta, as well as regions whose boundaries lie skew to any physical discontinuities, such as Utah and Saskatchewan; sharply demarcated territories such as the states of the Union, as well as vaguely defined territories such as deserts and plateaus. The world of geography includes unitary, connected entities as well as scattered ones, such as Polynesia or the USA; it includes material entities as well as immaterial ones, like tunnels and canyons; extended objects as well as unextended ones, such as the Poles or the Equator. Geography is about all these things and many other sorts of thing too, and parts and aggregates thereof, and the maps geographers draw are maps of this world of riches.

One would imagine that given this apparent ontological variety, geography constitutes an ideal domain for philosophical inquiry—a happy hunting ground

for any philosopher willing to enrich her diet of examples and case studies. Indeed, not only is the world of geography categorially exuberant. Geography is also intimately involved in philosophically subtle distinctions such as, for instance, the discrimination between an entity and its spatial location (Italy is not just a boot-shaped territory) or the opposition between identity and spatio-temporal coincidence (the city of Hamburg and the state of Hamburg are two things in one place). As some like to say, in geography the 'what' and the 'where' are not assimilated. Yet they are deeply intertwined and this gives rise to a host of puzzles—as when we ask whether a state-nation can survive radical changes in its territory, or whether it can survive without a territory, or whether it can move, or split, or merge with other nations, or change parts. The world of geography is philosophically interesting precisely in that many geographic entities exist in spatial reality (in the world "out there") while also depending for their existence on our social and cognitive practices. Rather surprisingly, however, not much work has been devoted by philosophers to these matters. There has been some interest in geography-related issues in certain areas of social and political philosophy (and related fields such as environmental ethics) and there is today a Society for Philosophy and Geography whose aim is precisely to bring together in a more systematic fashion discussions between these two disciplines.[1] Yet such developments have been motivated especially by practical concerns with, say, the exploration of cultural geographies, the social construction of nature, the iconography of landscape, and the like. The general theoretical apparatus with which geographers describe the world, as well as its metaphysical underpinnings, are still virtually unexplored and much in need of clarification.

Of course, one can deny that geography deals with a world of its own at all. Mountains—one could argue—are just large mounds of soil and lakes large quantities of water, and no geo-political or administrative entities should be countenanced over and above the territories that they occupy, the people whom they involve, and the objects with which those people have to deal in their ordinary daily practices. Or one could argue that if such geo-political entities exist at all, they exist as dependent entities—as entities that supervene or depend ontologically on their territories and on the people and ordinary objects that inhabit them, and perhaps on the behavioral settings in which people and ordinary objects interact. The same would apply to all other sorts of entity with which geography seems to be committed, including vegetation fields, industrial zones, population densities, or the colorful objects and fields that are depicted for example on weather maps. These are obvious options which the

philosopher of geography shares with any other philosopher engaged in the metaphysical investigation of the complex structures of the social world. But even if we take geography to lack a fundamental ontology of its own, the task remains of providing a precise characterization of the relevant reductionist analysis, or of the sort of supervenience that is involved in the geographic world. A lot can and should be said about the staggering metaphysical complexity of the overall picture.

The purpose of this issue of *Topoi* is to go some way in this direction. Some of the papers deal explicitly with questions of ontological categorization, in an effort to provide a better understanding of the way geographers articulate the reality with which they deal, while the other papers address questions arising specifically from the fact that geography is, above all, a theory of spatially extended structures. Thus, Barry Smith's 'Fiat Objects' and Amie Thomasson's 'Geographic Objects and the Science of Geography' address the first sort of question by dealing with the ways in which geographic objects and kinds may rightly be said to be mind-dependent, and with the consequences that these mind-dependencies have for the ontology as well as for the epistemology of geography. Consider for example the states of the so-called Northwest Ordinance, as they were brought into being by Thomas Jefferson's creative act. What sorts of entities are these, which can be created simply by drawing a few lines on a map? What are the forms and limits of such creativity? And if all geographic entities involve creative acts of some sort or other, is there any room for genuine geographic *discoveries*? These questions apply to the large-scale entities which we find depicted in ordinary maps and atlases but also to the smaller scale geographic world featured in a cadaster, to which Barry Smith and Leo Zaibert's 'The Metaphysics of Real Estate' is devoted. Here, too, the parceling of land into real estate is not simply a geometrical affair; it is crucial that people *believe* that the person who fenced off a plot of land is the one who actually owns it, so collective intentionality appears to be necessary to explain the difference between landed property and raw land. As for the second sort of question—the spatial (and spatiotemporal) structure of the geographic world—the complex set of representational tools of which geographers have availed themselves is extensively examined in Antony Galton's paper, 'Space, Time, and the Representation of Geographical Reality'. Here the options range from object-based and field-based representations to the mathematical opposition between continuous and discrete models to the related linguistic opposition between mass and count descriptions—as when we say that a certain region is "covered with forest" while another region has "three for-

ests". Some of these conceptual distinctions, in turn, may be affected by the phenomenon of vagueness, as when we try to specify exactly what it is that we are counting (or what it is that falls within the extension of a certain mass noun). This is the subject of Brandon Bennett's contribution, 'What Is a Forest?', while Roberto Casati's 'Cognitive Aspects of Gerrymandering' provides further material towards an assessment of the role that geometric properties at large appear to play in our ordinary conception of geographic entities. Finally, in 'Around the World' John Collins deals with a question that lies halfway between issues of vagueness and issues of geometric modeling. To fly non-stop around the world in a balloon was one of aviation's last great challenges—a challenge that survived even through the years of supersonic jet travelling. But what exactly constitutes a "circumnavigation" of the world? What sort of criteria should be used in settling the matter? And how did Bertrand Piccard and Brian Jones—the two balloonists who completed the first non-stop fly around the world on March 20, 1999—know that they had finally done it?

There is, of course, no pretence to completeness. But together these papers give an indicative picture of the wealth of philosophical material that hides behind the flat world of geographic maps. Let us see some more examples of how this can take us beyond the sort of issues that have thus far been considered in the philosophical literature devoted to geography-related matters.

The Mason-Dixon Puzzle

Unlike most ordinary objects, geographic entities are very closely tied to the regions of space which they occupy, even if one insists that the tie falls short of identity. Ordinary objects can move or otherwise migrate from one location to another; geographic entities are normally stationary (or move at the rate of geological changes). This means that geographic entities inherit from space many of its attributes, such as geometric and morphological properties. Politicians and cartographers alike are well aware of this fact when they divide up the world according to the principles of tessellation geometry, or when they rely on the four-color conjecture (for example) in coloring their maps. Indeed, geography deals with a geometric style of representation that finds its roots in the mereological structure of the extended world. It deals with entities that may overlap or fail to overlap or have parts that overlap in various ways. But these entities do not only possess extended *parts*. They also possess *boundaries*, which contribute as much to their ontological make-up as the parts themselves and which are of primary salience when it comes to matters of geographic cate-

gorization. Sometimes the exact location of a boundary may be unclear or controversial. Sometimes it is the identification of what a thing is that may affect the location of the relevant boundary. (The boundary of a given topographic feature may be located farther up or down the slope, for example, depending on whether the feature is identified as a marsh or as a lake.[2]) But there is no doubt that boundaries play a central role in the categorization and representation of geographic entities. An adequate account of the geographic world must, accordingly, involve a mereological theory of parts and wholes as well as a topological theory of boundaries.

Boundaries are also a source of troubles, though. Consider the Mason–Dixon line separating Maryland and Pennsylvania. Who owns it? Clearly it makes no sense to suppose that it belongs to one state rather than the other. But—equally clearly—we cannot say that the border is unowned: the States of the Union use up the whole territory—no boundaries can be left as thin lines *between* them. And we cannot say that the border belongs to both states, either: we are speaking of two adjacent states, so their territories cannot have any parts *in common*.

In this form, the puzzle is an instance of a broader problem that concerns the general concept of a boundary. As Leonardo put it in a memorable passage of his *Notebooks*: "What is it . . . that divides the atmosphere from the water?" Is there "a common boundary, which is neither air nor water but is without substance, because a body interposed between two bodies prevents their contact, and this does not happen in water with air"?[3] Or consider Peirce's worry about the line of demarcation between a black spot and a white background.[4] What color is it? Suppose we proceed along a path connecting the interior of the spot with the exterior. Clearly, given the density of the continuum, we do not pass through a last black point x and a first white point y; otherwise we should have to admit an infinite number of further points between x and y which would somehow be neither black nor white. Nor does it seem right to say that we pass through a boundary point that is both black and white. However, to acknowledge the existence of just one of x and y but not the other, as is dictated by the standard mathematical treatment of the continuum, would seem to amount to a peculiar privileging of one of the two regions over the other. It would introduce a peculiar, unjustified asymmetry between the two. And even if figure/ground considerations could be invoked to explain the asymmetry in the case of the black spot, other cases would be up for grabs. For what is figure and what is ground when it comes to two adjacent parts of the black spot? What is figure and what is ground when it comes to Maryland

and Pennsylvania? What happens when we pass the Mason–Dixon line? (This is a problem for the geographer as well as for the cartographer, though of course a physical *map* of the United States does not suffer from the problem in view of the digital character of the display. But normally we don't think of maps as finitary objects in this sense, as we don't normally worry about whether different tokens of the same map type must contain the same number of colored dots.)

It is difficult to deal with questions such as these, and this difficulty has served to stigmatize any realist attitude towards boundaries. We should do without boundaries—it is argued—and regard talk of boundaries as a mere *façon de parler* about other things (for example, about infinite series of nested extended regions).[5] Whether this line of reasoning is correct is a general question that we need not consider here. But we can consider the fact that geographers (and politicians, and perhaps people generally) do not take geographic boundaries to be abstract entities at all. People fight wars over such boundaries. They give their lives to defend the borders of their territories or to change them or to get rid of them. Geo-political boundaries are the spatial records of very complex patterns of interaction between neighboring communities, whether they mark the hostility between those communities or the secure relationships that they entertain. Even in times of peace there are entire industries (of real estate law, cadastral registration, land surveying) as well as a host of administrative offices (of passport control, customs and immigration check, etc.) which are devoted to the maintenance of such borders. As Thomas Wilson and Hastings Donnan have put it, national borders are "the political membranes through which people, goods, wealth and information must pass in order to be deemed acceptable or unacceptable by the state".[6] It is hard to regard all of this as being just about some *façon de parler.* And to the extent that geographic borders are taken seriously, the philosophical conundrums associated with the concept of a boundary must be taken seriously also. (Again, there is a granularity issue lurking in the background of such worries. We are thinking of boundaries as having zero thickness although most actual borders are locally two-dimensional, as with the no man's land that used to surround West Berlin. But this is irrelevant insofar as such borders are normally schematized by geographers either as lines or as bounded stripes—modulo the vagueness issues mentioned below.)

Not much politics can be settled by a philosophical explanation of the boundary concept—this is true. *A priori* accounts are likely to founder under the pressure of empirical evidence. Yet further questions can hardly be ad-

dressed without some understanding of the peculiarities associated with the concept of a geographic boundary. For certainly it is not the ordinary topological notion of a boundary that can do the job in all cases. For example, standard mathematical topology construes all boundaries as symmetric, in the sense that the boundary of a given entity is also a boundary of that entity's complement. But are all geographic boundaries symmetric in this sense? Often they are, because often a boundary is the result of negotiation and mutual agreement (a process that may take centuries, as in the case of the French-Spanish boundary in the Cerdanya [7]). But not all geographic boundaries are so balanced and in certain circumstances it might be more appropriate to speak of asymmetric or "oriented" boundaries—borders that bound a territory in one direction only, because only one of the geographic entities separated by the border recognizes the border itself. This was the case, for example, at the old border between the German Democratic and Federal Republics. And it is the case at any border whose recognition would amount to a legitimization of unaccepted military or political decision, as with the Line of Control in Kashmir (which India does not recognize) or with the Durand Line that marked the boundary between Afghanistan and Pakistan (which the Afghan government never fully accepted). In cases such as these, the standard topological picture is inadequate and a significantly different sort of topology—one that dispenses with the symmetry requirement—seems in order.

Besides, it is precisely the assumption that all boundaries must be treated in ordinary topological terms that gives rise to the conundrums associated with the Mason–Dixon line. As mentioned above, and as Smith argues in his paper, it would seem that geographers must instead distinguish at least two sorts of boundary. On the one hand, there are entities like Australia, the island of Malta, or Lake Ontario—entities whose boundaries correspond to some *bona fide* qualitative discontinuities (shorelines, water courses, etc.) in the underlying territory. On the other hand, we have Maryland and Pennsylvania, Saskatchewan, or the North Sea, whose boundaries are at least in part the result of human *fiat* and do not reflect any pre-existing physical differentiations. Boundaries of many other geographic entities, such as wetlands or areas of a given soil type, are also partly of the fiat sort, although they may be induced by cognitive or cultural processes (or scientific stipulation) rather than by legal or political processes. The articulation of these two notions of a boundary—Smith argues—is crucial to our understanding of the world of geography (if not to our understanding of the world of extended entities *tout court*). For example, it is precisely in relation to the fiat objects in our local geographic en-

vironment—e.g., in relation to parcels of real estate—that one indispensable role of the surveyor in our society is to be understood. Were it the case that only easily recognizable topographical features of the local environment were of significance in our lives, the role of the surveyor would be confined to the mapping of large-scale features of the terrain, features inaccessible to unaided perception but which are of importance for navigation, route-planning, and the like. Now, fiat boundaries may in the course of time come to involve physical components, such as barriers, walls, barbed-wire fences, or electronic devices. And sometimes bona fide boundaries may themselves be replaced by boundaries of the fiat sort, as when a bridge is built connecting two sides of a river, or when the course of a river is filled or otherwise deviated. (Kingsbridge lies on the north side of the Harlem River, but it is part of the Burrough of Manhattan because it lies south of the *original* course of the Harlem River.[8]) Still, the fiat-bona fide opposition is not a matter of degree. It is a strict categorial distinction. And once two types of boundaries are admitted, then again the question of their conceptual categorization arises. We may perhaps take the topology of bona fide boundaries to be standard topology, according to which genuine contact is only possible between two entities one of which is "open" in the contact area and the other "closed". (The island of Malta is, in this sense, a closed entity that is in contact with its open environment.) But fiat boundaries seem to call for a different sort of topology. Should the relevant notion of fiat contact allow for the possibility of spatial coincidence? Should the Mason–Dixon line be construed as consisting of *two* parts, two distinct but coinciding fiat boundaries demarcating Maryland and Pennsylvania, respectively?

Finally, sometimes we have to deal with borders and other geographic boundaries that are conceptualized in terms of fuzzy zones rather than crisp lines. The Mason–Dixon line is perfectly precise: the question of whether something is in Maryland or in Pennsylvania is at least in principle (and leaving aside geological changes on the surface of the earth) determined. Even problematic borders such as those between France and Spain in the past, or between Eire and Northern Ireland today, are perfectly crisp in spite of the existence of significant ethnic ties across them. But what about the border between Israel and its Arab neighbors? What about the borders of the Caribbean, or the borders of the Australian Outback? What about the boundaries of deserts, valleys, forests, and mountains? These do not seem to be crisp but rather imprecise, ill-defined, sparsly settled boundary-like regions.

Ubiquitous Vagueness

Let us consider this last issue a bit further. Vagueness is a pervasive phenomenon of human thought and language and, plainly, the world of geography is not exempted from its grasp. It makes no sense to ask for the *lowest mountain* on Earth, or for the *shortest river*, or for the *smallest city*. It makes no sense because such concepts as 'mountain', 'river', and 'village' do not have precise standards of application. For example, there is no precise lower bound to the height of a mountain, hence no criterion demarcating the lowest mountain from the tallest hill. As standard English dictionaries tell us, a mountain is just "a landmass that projects conspicuously above its surroundings and is higher than a hill", where a hill is "a natural elevation of land lower than a mountain".[9] Not much of an improvement on Sulkhan-Saba Orbeliani's definition of a mountain as "a high and cool place".[10]

One could, of course, resolve such vagueness by arbitrary stipulation. The British Geological Society sets the lower bound of a mountain at 2,000 feet. But that leaves many other features of 'mountain' unsettled. (A 2,000 high obelisk is not a mountain.) Alternatively, Quine once suggested a definition to the effect that a mountain is "any region of the earth's surface such that (a) the boundary is of uniform altitude, (b) the highest point, or one of them, is at an inclination of at least ten degrees above every boundary point and twenty degrees above some, and (c) the region is part of no other region fulfilling (a) and (b)."[11] This might work. But, again, it is a fact that no geographer has ever considered regimenting our language this way—not even the technical language of geography itself. So it is a fact that the language of geography is massively vague. (For another example, the geographer Tapani Sarjakoski has calculated that Finland has exactly 187,888 lakes, 179,584 islands, and 647 rivers.[12] A remarkable achievement. But the calculation depends on stipulative definitions that geographers themselves find problematic—e.g., on defining a lake as a body of water with a minimum area of 0.05 hectares. What of groups of ponds within a marsh, a marsh that may freeze over in the winter or dry in the summer? What of seasonal lakes resulting from snow melting? What of lakes that come and go as people build or demolish dams, reservoirs, barriers of various kinds for the purposes of artificial drainage?)

This sort of conceptual vagueness is a feature that geography shares with many other disciplines. Arguably, the conceptual apparatus of *every* discipline—including the physical sciences—is to some degree vague. But the vagueness of geography is more pervasive than just this. It does not only affect

the categorial apparatus with which geographers articulate the world; it also seems to affect the vast majority of the individual objects that geographers talk about. For what is it, exactly, that geographers talk about when they say that Everest is the tallest mountain on Earth, or that the Nile is the longest river, or Tokyo the largest city?

It is not just that there is some ambiguity in the terms at issue. It is obviously hard to compile an accurate comparative list of the world's most populous cities because of the variety of criteria that one can consider in order to identify the relevant urban agglomerations. Likewise, one might hesitate to call Everest the highest mountain insofar as there are different criteria for measuring the height of a mountain. But these are ambiguities that can easily be resolved. If we agree to include Yokohama and Kawasaki, then Tokyo is unquestionably the largest city in the world. Otherwise perhaps Seoul comes first, or perhaps Mexico City, or New York (provided Newark and Paterson are included). If we agree to measure mountain heights from sea level, then Everest is unquestionably the highest mountain on the planet (29,035 feet). But if we decided to measure heights from peak to base, then the trophy would go to the Hawaiian volcano Mauna Kea (33,480 feet, against Everest's modest 11,000); and if we looked at the distance from the peak to the center of the Earth, as some like to do, then the tallest mountain of all would be the Chimborazo volcano in the Andes (some 7,000 feet higher than Everest). These are minor ambiguities and can easily be eliminated by stipulation. The main, defiant difficulty is that once these ambiguities have been eliminated some deep, ineliminable vagueness remains. For just what is this mountain that measures 29,035 feet from sea level? What exactly is Mount Everest? Where does it begin and where does it end? And what about the boundaries of the other geographic entities that we have just mentioned and which are mentioned in our maps of the world?

As Bennett points out in his contribution, geographers have long been aware of the difficulties involved in such questions and much effort has been devoted (by surveyors and cartographers as well as by researchers in computerized geographic information science) to devising ways of keeping vagueness under control.[13] Some speak as though this sort of vagueness were truly ontological. To say that there are no definite boundaries demarcating Mount Everest (for example) would then amount to treating Everest as a fuzzy object. Some regions would definitely overlap Everest and others would definitely not overlap it, but the peripheral regions would have an indefinite status: there would be no fact of the matter about whether or not they overlap the mountain. The same would apply to all other mountains as well as to other sorts of geographic

entities such as cities, forests, rivers, neighborhoods, and so on. These would all be genuinely vague denizens of reality. Like the figures of a Seurat painting, they would lack definite boundaries. Their boundaries would literally fade away and the traditional topological distinction between interior and exterior would represent an unrealistic idealization.[14]

Other people would rather speak of the indeterminacy of geography as being semantic, not ontological. The vagueness would lie exclusively in the geographic nomenclature, and to say that a certain name designates an object with vague boundaries would be to say that the name vaguely designates an object, not that it designates a vague object.[15] Everest, for example, would have vague boundaries insofar as the referent of 'Everest' has been vaguely fixed (possibly because of the vagueness of the sortal concept *mountain*). But this would not imply that there is a genuinely scruffy object out there. There would be many mounds of soil that could conceivably be associated with the name 'Everest'—many ways of tracing the limits of a mountain-shaped region that would conform to how the name is actually used—but each one of them would be perfectly determinate. The term would be vague precisely because of this multitude of equally acceptable semantic options.

Whether we think of Everest as a vague object or of 'Everest' as a vague name, it is clear that the indeterminacy involved in cases such as this does not reduce to ambiguity. This indeterminacy bears the mark of vagueness because it gives rise to paradoxical arguments of the sorites variety, which are the quintessential symptom of vagueness: It is obvious that one foot away from the top we are still on Everest; and it seems natural so say that if we are still on Everest n feet away from the top, then we are on Everest $n + 1$ feet away from the top. (One foot makes no difference.) Yet these two statements logically imply that we must be on Everest at any distance from the top—and this is absurd. Either we give up some basic logical principles or we find a way of rejecting one of the premises—presumably the second.[16] But notice: this is not something that we can do on epistemic grounds, as if our inclination to assent to the second premise of the sorites paradox were just a matter of our ignorance. The boundaries of Everest are not just unknown (or unknowable) to us. They are genuinely indeterminate. Not even God could walk down the slope of the mountain and utter, at some point: "Here ends Everest."

Drawing the Line

Some might insist that these worries are wrong-headed. The geographer David

Mark, for example, stresses the fact that "people can and do refer to particular mountains without ever thinking about whether the mountain has a boundary, never mind considering that the boundary is at some place."[17] We normally know how to use mountain names—and geographic terms at large—without being able to provide a precise explanation of the grounds for this competence, just as we may know what sound a violin makes without being able to explain it. This can hardly be questioned. Still, there is a philosophically interesting question here. For just what model can we offer of this sort of competence—of our ability to live with vagueness in cases such as these? Why, for example, do we all agree that Mount Everest is in Asia and that it is not in Europe, though we may disagree or suspend judgment as to how far West it extends? And how do we avoid the slippery slope represented by the sorites paradox?

Again, if we put it this way then the problem arises in every domain—not just in geography. What are the boundaries of that cloud in the sky? Where exactly is the edge of this puddle? Where exactly did the French Revolution take place? There is indeed a significant analogy between cases such as these and the sort of vagueness that manifests itself in the geographic world. But perhaps the analogy comes precisely from the fact that vagueness appears to be a matter of vague *boundaries*, and as we have just seen the world of geography is a world where boundaries matter a lot. (We do, after all, speak of *atlases* of surgical anatomy, *maps* of the brain, etc.)

The categorial distinction between fiat and bona fide boundaries seems to play a crucial role in this respect. Bona fide boundaries, one could argue, are always crisp, at least to the extent that they reflect some genuine discontinuity in the underlying physical territory. By contrast, fiat boundaries need not be crisp. Sometimes they are, as is the case with the borders of such geopolitical entities as nations, states, counties, and postal districts, as also with the borders of land parcels registered in a cadaster. But often the process leading to the drawing of a fiat boundary is not precise—as in the case of the Caribbean or of Downtown Manhattan. In such cases the question of whether something is on this side or on that side of the border may be indeterminate. This is also true of those geopolitical entities whose borders are delimited with painful difficulty, by wrestling and fighting rather than by sharpening the pencils in the hands of the geographers.[18] (Even where the resulting boundary is sharp, political geographers and anthropologists often speak of a vague 'frontier', understood as a broad area of *bon voisinage*.) And the same is true of many geophysical entities as well, such as deserts and rivers and bays and mountains, to which ordinary people and geographers alike refer in their daily practices. When the name

'Everest' was introduced, a referent was carved out in such a way that part of its boundary (the surface that separates its interior from the atmosphere) was of the bona fide sort; it existed independently of our conceptualizing activity. But part of the boundary (that part which should demarcate the foothills of Everest) was of the fiat sort. It did not correspond to any natural discontinuity and the members of the Indian Geodetic Office who introduced the name—or the geographers who followed—did not bother to make themselves precise.

To be sure, even bona fide boundaries may involve vagueness of some sort, but only insofar as sometimes it is just not clear *what* the relevant bona fide boundary is. Consider the question "Just where, and how long, is the coastline of Britain?" familiar from discussion of fractals.[19] Or consider the fact that in some cases the bona fide discontinuity represented by a river (say) is no more than a *constraint* on the definition of the official geographic boundary. This is often identified with an invisible, fiat line that goes somewhere through the "middle" of the river, or it may be identified with one of the two shore lines, as with the Vermont–New Hampshire boundary (which is identified with the Vermont bank of the Connecticut River). Cases such as these may in fact have practical consequences. Allen Hazen informs me that the railroad company that built the line up the Connecticut Valley (a line now used by Amtrak's overnight New York–Montreal train) built it basically on the Vermont side of the river, but in a few places crossed minor indentations in the bank on causeways. "This was deemed to take them into New Hampshire—Hazen continues—so the company had to have a New Hampshire charter: a cruder approximation to the actual curve (approximating it with a series of tangents a few hundred feet in length, say) might have avoided this."[20] These are interesting cases, and the world of geography is full of them. But it seems reasonable to say that the vagueness that they exhibit is not a feature of the relevant bona fide boundaries. Rather, it is the identification and exploitation of those boundaries on the parts of the geographers and politicians that appears to suffer from carelessness and lack of precision.

One interesting question, then, is whether the distinction between fiat and bona fide boundaries can be used directly to support a distinction between semantic and ontic vagueness. One could argue that all vagueness is semantic (or cognitive at large) precisely insofar as it pertains exclusively to the realm of fiat articulations.[21] As Smith emphasizes, however, the fiat-bona fide dichotomy can be drawn not merely in relation to boundaries but in relation to objects also. Australia is a bona fide geographic entity but Saskatchewan, the states of

the Ordinance, or the North Sea are fiat entities. And yet their fiat nature does not deprive them of the objectivity which geographers attribute to them. Fiat entities, one could argue, are just as real as bona fide entities. Hence, to say that vagueness pertains to the realm of fiat articulations would be to say that it affects *entities of a kind*. In other words, if the distinction between fiat and bona fide entities has ontological force, then so does the corresponding phenomenon of vagueness—or so one could argue. Besides, perhaps fiat boundaries are much more pervasive than our examples suggest. Perhaps they are *always* at work in articulating the objects with which geographers have to deal. If we think of a physical body as an intricate system of tiny, microscopic particles, then even the physical boundary of Everest—that which separates it from the atmosphere—involves some degree of arbitrariness. The same may be true for all sorts of seemingly bona fide boundaries, including the boundaries of islands, lakes, and planets. (Bennett suggests something along these lines in connection with the boundaries of forests.) To the extent that such entities can be said to have vague boundaries, their boundaries must indeed be of the fiat sort. But to the extent that these are entities at all, their vagueness would seem to be of the ontological sort after all.

Border Identities

Geographic boundaries are not static. They change all the time. And as boundaries change, so do the geographic entities that they bound. Just as Libya and Egypt have seen their borders being drawn and drawn again on the drifting sands of the Sahara desert, political cartographers have been quite busy recently, drawing and erasing and re-drawing their maps of the world. As Czechoslovakia split and Yugoslavia fragmented, Germany united. As the Soviet Union abolished itself, the European Union became a political reality. As Eritrea became independent, Hong Kong was incorporated into China. And how long will the incorporation of Taiwan be delayed? How long will the two Koreas continue to be divided by a latitudinal line? How long will Quebec continue to be part of Canada?

Politics is restless and geography follows the flux. And sometimes geography itself becomes a tool of political identity, as when the colonial powers relied on cartography to subdivide the "heaten lands": the drawing of a few lines of ink was all it took to legitimize (and simplify) their territorial conquest in spite of any existing social and political structures. Jefferson's creation of the Northwest Ordinance was not different. That maps drawn up by diplomats

and generals turn into a political reality is an important and recurrent fact—a fact which, as Mark Monmonier pointed out, lends an unintended irony to the aphorism that the pen is mightier than the sward.[22]

Even when the relevant boundaries are of the bona fide sort, changes may occur which must be dealt with by politics and geography alike. The Rio Grande meanders from time to time, stranding bits of American or Mexican land on the wrong side (and making it necessary to have periodic treaties adjusting the official boundary). All of this is serious business and philosophers can hardly hope to say a word. Yet underlying this serious business of life the philosophical issues are deep indeed. For what is at stake is our understanding of the identity and persistence conditions of geographic entities broadly understood. Presumably the case of natural geographic objects such as rivers and mountains is akin to that of other macroscopic physical entities such as stones and trees and people and heaps of sand. But what about nations, cities, real-estate subdivisions—what about all those geographic entities that are closely associated with some form of systematically organized human activity? How are their identity and persistence conditions to be understood?[23]

Arguably, the answer to this question involves a complicated intertwining of anthropological and political considerations. These, in turn, involve a variety of complex factors relating to the way the actions and intentions of individual people interact and harmonize (and to the way those geographic entities depend for their existence on the beliefs and customs of the people who inhabit them, as Thomasson emphasizes in her paper). The often-quoted words of Rupert Emerson, for example, stress the subjective dimension of a nation as "a body of people who feel that they are a nation"[24] (or a body of people who "consider themselves to form a nation, or behave as if they formed one", as Hugh Seton-Watson put it [25]). This is not too different from the claim that the identity and persistence conditions of a living organism—a person, for example—involve various sorts of considerations relating to biological and psychological factors in addition to mere spatio-temporal continuity. But as with living organisms, spatio-temporal continuity is itself a source of puzzles when it comes to the entities of geography.

Consider Canada and its politically recalcitrant component, the province of Quebec. Let 'Canad*' designate the portion of Canada that does not include Quebec (i,.e., that portion that comprises all other Canadian provinces). Today Canad* is a proper part of Canada. But suppose tomorrow Quebec becomes independent. Shall we say then that Canad* becomes identical with Canada? Shall we say instead that Canad* and Canada remain distinct even though they

end up occupying the same region of space? Shall we say that Canada does not survive at all the loss of Quebec, though the *name* 'Canada' is inherited by Canad* (rather than by Quebec) in virtue of its significant similarity with the original nation?

The puzzle is indeed similar to a familiar conundrum often discussed in connection with the persistence conditions of living organisms—as when Tibbles the cat has her tail cut off in an accident. Does the cat survive the event? Does it become identical to one of its proper parts? Does it become spatially coincident with a proper part?[26] But note the complication. In the case of Tibbles, the relevant event is one that involves genuine physical change. The tail is physically separated from the rest of the body, and this affects both the cat as a whole (which is said to have lost one of its parts) and the proper part of the cat which becomes coincident with the whole (which has not lost parts but has gained a boundary—a new piece of bona fide boundary replacing the old fiat, vague boundary which separated it from the tail). It is the occurrence of this physical change that gives rise to the puzzle and that must be accounted for by an adequate philosophical solution. In the (hypothetical) case of Canada's loss of Quebec, by contrast, there is no physical change at all. The geometry of the situation is completely unaffected by the political separation, as Quebec is of course not physically removed from the neighboring provinces. No bona fide boundary is created which takes over a pre-existing fiat boundary. But neither is this a mere case of Cambridge change that results in substantial change—for fiat topological relations are not merely Cambridge relations. The separation occurs entirely in the realm of fiat articulations, but it is a genuine separation nonetheless.

Once again, this is a sign of the double-barreled nature of geographic entities, which are intimately connected to the space that they occupy and yet also deeply infected by the activity of human conceptualization. In the world of political geography the 'what' and the 'where' are intimately related and yet the identity and persistence conditions of certain geographic entities—a nation, a province, a neighborhood—do not supervene entirely on the identity and persistence conditions of the regions that they occupy. A much more complicated story is in order.

Geometric Biases

Consider also the fact that sometimes our intuitions—and the intuitions of the politicians who deal directly with these matters—seem to be driven by a num-

ber of geometric biases that call for a systematic account. If Quebec were an island, disconnected from the main body of Canada, the separation would presumably be easier. By contrast, if Quebec were right in the middle of Canada, completely surrounded by the other provinces, the separation would be more difficult. Quebec would acquire independence, but at the cost of becoming politically secluded from the rest of the world; and Canad* would find itself with a curious disk-shaped territory, characterized by an exterior boundary and by an interior one. (There are some such territories, but they are rare. There is even a territory with two holes—Italy—though presumably the relative size of the enclaves is a factor to be considered.) Likewise, if Quebec were a strip of land separating Western from Eastern Canada, the separation of Quebec would effectively correspond to a geometric partition of the territory, which in turn might lead to a political splitting of Canad* into two independent countries. (It's hard to stick together when one has to go through customs twice in order to deliver national goods.)

And these are just some examples. Another dominant intuition seems to be that the drawing of geographic boundaries must result in a sort of complete *tiling* of the world, whereby geographic objects are assigned corresponding regions of space so as to cover the globe in a neat, topologically regular way. We may actually distinguish three allied intuitions here, to the effect that (i) every officially recognized geographic entity must have a spatial location; (ii) every spatial location must be assigned to a corresponding geographic entity (there should not be patches of no man's land); and (iii) no two geographic entities of the same type can have the same location—not even overlapping locations. These conditions are well represented in ordinary maps by the coloring conventions: every region of the map has a unique color and every color is the color of a unique region. For example, all three conditions are satisfied by the "natural tiling" induced by the division of the earth's surface into land (green) and water (blue). They are satisfied, also, by the tiling induced by the political division of the earth's surface into nations (including quasi-nations such as Antarctica), national waters, and international waters. And they are satisfied by the divisions of a state's territory into provinces, into postal districts, into voting precincts, and so on. But what is the force of these conditions, and how do they affect our assessment of the geopolitical issues discussed above? Dropping (i), for example, would license non-spatial geographic entities such as the Sovereign Military Hospitaler Order of St. John, or perhaps Poland during the Era of Partition. Do we want to allow for this possibility? Or do we want to save condition (i) by providing every problematic entity with some more or

less arbitrarily chosen location—e.g., by locating Poland during the Era of Partition in the British headquarters of the Government in Exile?

Topological uniformity is another condition that seems to play a significant role in our intuitive understanding of what counts as a "natural" geographic entity. As Casati argues in his contribution, geographic cognition appears to be biased towards what he terms the *island paradigm*, according to which the prototypical geopolitical unit is naturally bounded and maximally self-connected—an island. Perhaps this is true of all entities, including the objects of ordinary experience: few people find it natural to conceive of objects that are attached to other objects, or that consist of two or more spatially detached parts. (Psychologists confirm that the bias for maximal connectedness is strong in children, which carve out objects correspondingly.[27]) But why is this topological property so important? And why is it geographically important? Casati's conjecture is that the answer cannot be found exclusively in the mathematical aspects of this property. Maximal connectedness is not just a spatially meaningful notion. It is also *causally* significant, and the island metaphor suggests why. Islands are structurally simple, cohesive, unitary, easier to oversee and to protect from external aggressors. Scattered entities are weak, hard to govern, and prone to internal conflicts and to external pressure.[28]

A lot remains to be said about the philosophical challenges that lie hidden in the flat world of geographic maps. Geography is philosophically interesting because of its peculiar trade-off between empirical data and demands, on the one hand, and uncharted theoretical issues, on the other. But the purpose of this issue of *Topoi* is not to provide a comprehensive picture. Nor is it to serve as an introductory overview to the "Philosophy of Geography" as a whole. More modestly, or perhaps more ambitiously, the aim is to give a taste of this exciting area of research and of some directions along which it is likely to yield fruitful developments. I have briefly reviewed some examples here. Many more will be examined in the pages that follow.

Notes

[1] The Society was founded in 1995 and publishes regularly the journal *Philosophy and Geography.*

[2] I borrow the example from Mark and Smith (1998), which provides a good overview of the peculiarities that characterize the interplay between *what* and *where* in geography.

[3] MacCurdy (1938), pp. 75–76.

[4] Peirce (1893), p. 98.

[5] This view is rooted in the work of Whitehead (1929), Part IV ('The Theory of Extension'). For a survey of related positions I refer to Varzi (1997).

[6] Wilson and Donnan (1998), p. 9.

[7] Sahlins (1989) provides a detailed reconstruction of this paradigmatic case, with extensive references to the historical and legal literature on boundary making.

[8] Thanks to Allen Hazen for bringing this case (and other cases mentioned below) to my attention.

[9] These definitions are from the *Merriam-Webster's Collegiate Dictionary*. Some other typical definitions: 'A natural elevation of the earth's surface rising more or less abruptly from the surrounding level, and attaining an altitude which, relatively to adjacent elevations, is impressive or notable' (*Oxford English Dictionary*); 'A landform that rises prominently above its surroundings, generally exhibiting steep slopes, a relatively confined summit area, and considerable local relief. Mountains generally are understood to be larger than hills, but the term has no standardized geological meaning' (*Encyclopedia Britannica*); 'A natural elevation of the earth's surface having considerable mass, generally steep sides, and a height greater than that of a hill.' (*American Heritage E-Dictionary*).

[10] In his 1716 Dictionary of Georgian.

[11] Quine (1981), p. 33.

[12] Sarjakoski (1996).

[13] See, for instance, the papers collected in Burrough and Frank (1996).

[14] Among philosophers, this view has been put forward most explicitly by Tye (1990).

[15] Clear statements of this view may be found e.g. in Heller (1996) and McGee (1997).

[16] For a selection of relevant literature on vagueness and the sorites paradox, see Keefe and Smith (1997).

[17] In Mark (2001).

[18] There is a conspicuous literature on the legal mechanisms of sharp and symmetric boundary making. A classic reference is Jones (1945).

[19] See Mandelbrot (1967). Some philosophers take questions such as these, and the lack of a definite answer, to be a sign of ontological vagueness; see e.g. Copeland (1994).

[20] Personal communication.

[21] I have argued for this view in Varzi (2001).

[22] Monmonier (1991), p. 90. Compare Geyer and Green (1992) on the Gulf War.

[23] This sort of question has significant ramifications not only in geography and politics, but also in computerized geographic information science. Compare Langran (1992) and especially Eschenbach (2001).

[24] In Emerson (1960), p. 102.

[25] Seton-Watson (1977), p. 5.

[26] For a selection of recent relevant literature on these issues, see Rea (1997).

[27] See e.g. Shipley and Shepperson (1990) or Spelke (1994). Think also of the centrality of topological connection in certain cognitive accounts of "natural properties", as in Gärdenfors (2000).

[28] Compare also Smith (1997) on the relevance of "cognitive geometry" to the aetiology of war.

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