

Chapter 9

What a Geographical Entity Could Be



Timothy Tambassi

Abstract The main task of this article is providing a sketch of possible approaches, response attempts, conundrums and issues arising from the question: ‘What is a geographical entity?’. It is shown how trying to answer this question is made particularly difficult by a multiplicity of aspects that might be summarized as follows: (1) There exist multiple conceptualizations of the geographical world. (2) Different languages and cultures may slice such a world in different ways. (3) The geographical world has changed and will change over time. (4) Also geography (as a discipline) has changed and will change over time, modifying its perspective, tools, domains of investigation and aims. Consequently, what had, has been, will be considered as non-geographic could be considered as geographic and vice versa. (5) There were, are and will be different kinds of geographies as well as different geographical branches, each of them had, have and might have different tools, aims, points of view and vocabularies. (6) The introduction of new scholarly fields and new technologies, the birth of intellectual movements or paradigm shifts and developments on other disciplinary contexts can/will influence geography as a discipline.

Keywords Geographical entity · Ontology of geography · Ontology of GIS · Definitions · Laundry-lists · Boundaries · Maps · Granularity · Ontological perspectivalism · Hierarchical structures · Geographical conceptualizations · Cultural diversities · Linguistic differences · Vagueness · Historical entities · Geographical kinds

A Chaotic List that Cries Out for Explanation

Providing a complete list of geographical entities would be a very long and (potentially) extravagant task, given the innumerable functions and purposes that geographical entities might have and the variety of (disciplinary) contexts from which they emerge.

T. Tambassi (✉)
Department of Humanities, University of Eastern Piedmont, Vercelli, Italy
e-mail: timothy.tambassi@gmail.com

ICUB, University of Bucharest, Bucharest, Romania

They might arise from the physical world such as, for example, mountains, seas, oceans, rivers, islands, deserts, and so forth (Inkpen and Wilson 2013). They can emerge from the combination of environmental features (of the physical world) and demarcations introduced by human cognition and action (i.e. bays, promontories and so on). They might also be the result of political and administrative subdivisions, law decrees, land ownerships such as nations, regions, postal districts and so on, involving social conventions on a number of different levels, generally marked by differences in the ways different societies structure the world (Smith and Mark 1998). In addition, an inventory of geographical entities can also include human-made objects such as streets, buildings and so forth (Laurini 2017).

Obviously, we could go on and on, listing kinds and sub-kinds of geographical entities or emphasizing that they may be zero-, one-, two-, or three-dimensional such as, respectively, the South Pole, the Tropic of Cancer, Canada (a two-dimensional object with a curvature in three-dimensional space), and the North Sea—that, according to the context, can refer either to the three-dimensional body of water, or to its two-dimensional surface (Smith and Mark 1998).

Moreover, geographical entities can be disconnected like countries with several islands or like France with Martinique, Guyana, New Caledonia, etc. Sometimes, they have ‘holes’ such as South Africa has with Lesotho. Some have sharp borders, others indeterminate boundaries. They also can be simple, made up by other geographical entities or share mereological or topological relations with other geographical entities or with their parts (Varzi 2007).

Furthermore, some geographical entities also have some sorts of relations both with the (surface of the) Earth and with the space they occupy (Casati and Varzi 1999). Generally speaking, a relational theorist of space would say that entities are cognitively and metaphysically prior to space (there is no way to identify a region of space except by reference to what is or could be located or take place at that region). In contrast, an absolutist theorist would say that space exists as an independently subsistent individual (a sort of container) over and above its inhabitants (objects, events and spatial relations between objects and events, or without all these entities).

This chaotic list cries out for order and explanation. Is there really something such as a geographical entity? What, if anything, do geographical entities have in common? What sorts of entities are they, how are they individuated, and what are their identity conditions (Bishr 2007)? How to distinguish between what is a geographical entity from what is not? What is the difference, if any, between geographical and spatial entities? Are there geographical entities that are not spatial and/or spatial entities that are not geographical? What are the sorts of factors that might influence our inventory of geographical entities? What is the relationship between geographical entities and their representation in maps (Casti 2015)? Should we think of geographical entities in general, or is it more appropriate to assume that every geographical sub-area has a proper list/account of geographical entities?

Avoiding Univocal and Incomplete Accounts

In approaching those questions, one of the main issues will be to avoid univocal and incomplete accounts, which could be suitable for some theoretical tasks but not rich enough to grasp the complexity of our ways of representing the geographical world. Geography, indeed, has had hundreds of years to elaborate on different sorts of geographical entities for innumerable purposes. Moreover, geography (as a discipline) has changed over time, modifying its perspective, sometimes its aims, subdividing itself into different branches and weaving together with different scientific, social, and technical disciplines (Pattinson 1963; Couclelis 1998; Bonnett 2008; Sala 2009). In this sense, what can be considered as geographic has changed according to the geographical perspective we endorse. Furthermore, we should also observe that different languages and cultures have created different vocabularies and ways of slicing the words, producing (potentially) different kinds of geographical entities. The fact that geographical reality/realities can be studied, sliced and represented in different ways does not surely exclude that such alternative descriptions of the geographical world can be compared, overlapped and/or integrated with one another in order to get hold of improved accounts of reality itself.¹ Hence, by paraphrasing the words of Epstein (2017), the proposed analysis will be multifaceted and will fight the prevailing philosophical trend of simplifying the endless diversity and variation among different geographical perspectives (Elden 2009; Tanca 2012; Günzel 2001).

In light of these considerations, the aim of the next pages is to present a series of possible issues, conundrums and approaches for analyzing and explaining the nature of geographical entities. Surely, such a series should not be conceived as exhaustive, nor the approaches as isolated one from another. Instead, there can be mixed cases that might be seen as a combination of different approaches—for example, between laundry-lists, attempts of definition and others. The same can be said both for issues and conundrums, which rarely appear alone and sometimes persist also across the different approaches we discuss. Finally, we should underline that the choice of the term ‘entity’ is not neutral in this context and can be considered as problematic. Indeed, as Smith and Mark (2001) have remarked, philosophical ontologists have long been aware of the controversial character of ontological terminology. In this sense, the term that should be used for the ontological supercategory (things, entities, items, existents, realities, objects, somethings, tokens, instances, particulars, individuals) within which everything belongs is not exempt from possible criticisms. Each alternative has its adherents, yet each also brings problems and sometimes different inventories. In this case, the choice of ‘entity’ is given by the needs of generality and exhaustiveness (that is common to other terms), which is specified by the possibility of being inclusive, on the one hand for items such as relations, kinds and so forth, on the other hand for things that might be abstract, universals or non-instantiated. Accordingly, such a choice means to not exclude, a priori, the possible existence of these sorts of things, which could be easily compromised, for

¹Therefore, my theoretical point of view may be seen as closed to *ontological perspectivalism* (Bateman and Farrar 2004; Grenon and Smith 2007; Elford 2012).

example, by the use of terms such as existents, particulars, instances and so on. With this, I am not saying that using terms other than entity is not appropriate, nor that it cannot bring (in principle) similar results. Rather, I would like to remark that the purpose of these pages is to show some different approaches, issues and conundrums which emerge from the debate on geographical entities, with the aim of drawing a boundary (at least, a theoretical boundary) for distinguishing what is geographical from what is not.

Laundry-Lists

Within the philosophical debate, when asked to provide a definition of ‘ontological category’, a possible answer consists in giving not some particular examples of ontological categories, but a full list of all of them, without further specifications. Surely, it is useful to know what has been regarded as an ontological category in the history of philosophy or what a particular author regards as such. But no matter how much interesting a list might be in itself, it is certainly no substitute for a definition. Rather, the list sets the stage by indicating which kinds of things our definition should incorporate (Westerhoff 2005, pp. 23–4).

Now, if the narrow number of ontological categories should guarantee an almost exhaustive list of ontological categories,² a list of geographical entities can difficultly strive for such an exhaustiveness. Therefore, a laundry-list position in geography will give only few (and maybe paradigmatic) examples of geographical entities, at the expense of an excessive long and tedious catalogue of all of them. But how to provide such examples? According to Varzi (2001), normally, we know how to use geographic terms without being able to provide a precise explanation of the grounds for this competence. Presumably, the model of family resemblance shows how, in ordinary circumstances, a word can be used successfully regardless of whether or not it meets the Fregean ideal of precision. We say that something is a geographic entity because it resembles (in some relevant respect) several things that have hitherto been said to be a geographic entity, even if the exact nature of this resemblance may give rise to borderline cases.

Nowadays, the laundry-list position constitutes a recurring integration of many attempts at definition of geographical entity.³ A non-exhaustive explanation can be traced in the ambiguous epistemological status of geography (that ranges, among others, from physical and human approaches to spatial analysis), for which a laundry-list, even before a definition, seems to guarantee a continuity among different geographical sub-areas. However, some difficulties may arise in deciding whether some

²In theory, such a list should also be open to the inclusion of new empirical and theoretical evidences, which might modify and/or extend it.

³See for instance: Casati et al. (1998), Smith and Mark (2001) and the link https://definedterm.com/geographic_entity. In the geographical debate, other examples of laundry-lists (that integrate some attempts of definition of ‘geographical entity’) can be found in some of the more general classes of geo-ontologies. For a list (not a laundry-list) of the main geo-ontologies see Tambassi (2017a).

particular entities in the lists are (or not) geographical entities. In that case, what criteria should we use for selecting the geographical entities from the realm of entities? What does unify a nation, a mountain, a latitude and makes us classify them as geographical entities? In other words, what, if anything, do geographical entities have in common?

Attempts of Definition

A possible answer to the questions above might deal with the *definition of geographical entity*—that is, to specify what a geographical entity is by exhibiting its conditions of existence, individuation and persistence, and its criteria of identity (synchronic and diachronic). According to Bishr (2007), identity criteria provide sufficient conditions for determining the identity of concepts defined in the domain we have to describe. For the purpose of these pages, providing identity criteria might be useful for the following:

- classifying an entity as an instance of the class *geographical entity* [GE];
- individuating an entity as a countably distinct instance of GE;
- identifying two entities at a given time (synchronic identity);
- reidentifying an instance of GE across time (persistence, or diachronic identity).

Once we fix the identity criteria for geographical entities, it is essential to determine what (geographic) entities (objects, relations, kinds, facts, events, spatial regions and so forth) have to be included as fundamental. Moreover, we should also establish whether our list of geographical entities will comprehend only entities such as mountains, rivers, deserts, etc., traditionally linked to the physical geography and/or also artifacts studied by human geography (entities like socioeconomic units, nations, cities and so on). In this regard, Casati et al. (1998) have distinguished three main different positions on the existence of geographic entities, which are given as follows:

- strong methodological individualism—there are “only people and the tables and chairs they interact with on the mesoscopic level, and no units on the geographic scale at all”;
- geographic realism—“geographic entities exist over and above the individuals that they appear to be related to and have the same ontological standing as these”;
- weak methodological individualism—if geographic units exist, “then they depend upon or are supervenient upon individuals. One form of this position would accept both individuals and the behavioural settings in which individuals act. Larger-scale socioeconomic units would then be accounted for in terms of various kinds of connections between behavioural settings” (Casati et al. 1998, p. 79).

However, despite these clarifications, some issues remain unaffected. In particular, what entities should we classify as instances of the class ‘geographical entities’? How to distinguish between what is a geographical entity from what is not? What is

the definition of geographical entity? How could we possibly distinguish, among the physical entities, those that are specifically geographic? Where is the exact boundary between physical and human (geographical) entities? And between spatial and geographical entities?

On Being Portrayed on Maps

It seems that [...] it is being portrayable on a map which comes closest to capturing the meaning of 'geographic' as this term is employed in scientific contexts. Geographers, it seems, are not studying geographical things as such things are conceptualized by naïve subjects. Rather, they are studying the domain of what can be portrayed on maps (Smith and Mark 2001, p. 609).

Smith and Mark have made the point clear: if geographers study the domain of what can be portrayed on maps, then being portrayed on maps can say something about the notion of geographical entity. Now, let's suppose that the notions of *being portrayed on maps* and *geographical entity* correspond—in other words, that:

- (1) an entity is geographical if and only if it can be portrayed on maps
and
- (2) something can be portrayed on maps if and only if it is a geographical entity.

Obviously, such an identity relation could easily solve some problems concerning the identification of geographical entities. However, it might also raise a number of ontological conundrums that have not yet been addressed.

The first one is that the question of the definition seems to be simply shifted from the notion of geographical entity to the notion of map. This might also lead to subordinate the notion of entity to its representation⁴ and maybe, more generally, the geography to the cartography.⁵

The second conundrum concerns what to do in the face of

- nonspatial geographical entities, which can be difficult to locate in a map—for example, Poland during the Era of Partition, that is, the era in which the entity in question did not have any territory to call as its own land;
- (and/or) unusual maps, for instance treasure maps, maps that also include imaginary entities (such as Atlantis), maps using GPS coordinates (such as Google Maps) and so forth.

In all these cases, would we be willing to include the treasure, Atlantis and/or maybe ourselves in the inventory of geographical entities, too?

Finally, the third conundrum is strictly related with the first one and concerns the relationship between the notions of map and geographical entity. If, on the one

⁴In which case, we should, perhaps, also ask whether it is more appropriate to talk about cartographic entities rather than geographical entities.

⁵About the non-correspondence between geography and cartography, and more in general, on the critique of 'cartographic reason', see: Farinelli (2003, 2009).

side, we can have some difficulties in imagining geographical entities that cannot be portrayed on map; on the other side, some issues might arise with extremely detailed maps that represent not only entities such as seas, nations, streets, etc. but also trees, sidewalks, lampposts, for which we would probably have more trouble in classifying them as properly geographic. But then, what would we be willing to include among the geographical entities?

Maps, Granularity of Interest and Multiple Levels of Details

A possible way of answering the previous question might be to include, among the geographical entities, also entities like trees, sidewalks and lampposts. But in the face of more detailed maps, the risk is that our list of geographical entities also comprehends the leaves of those trees, the columns of those lampposts, a blade of grass of a garden and so forth. An alternative can be to consider (only) maps which are not so detailed, that is, maps, containing only geographical things. But, how to build such maps?

One of the issues in this matter might be the concept of granularity of interest, according to which geographic objects can mutate in the following two different ways:

- as the scale diminishes, an area will mutate into a point and then will disappear;
- as the scale enlarges, something might appear as a point and then mutate into an area.

Of course, a conceptualization of geographic space may have several levels of granularity, each of which has a specific inventory of geographical entities at different levels of detail. However, nothing excludes that once the scale is enlarged, the granularity of interest might also contain manipulable objects (see section “[On What and Where](#)”) that, according to Egenhofer and Mark (1995), should not be properly included in the geographic space (and within geographical entities). Rather, the two authors maintain that geographic space shall include entities such as ‘hotel with its many rooms, hallways, floors, etc.’, ‘Vienna, with its streets, buildings, parks, and people’, ‘Europe with mountains, lakes and rivers, transportation systems, political subdivisions, cultural variations, and so on’. In other words, geographical space represents the space in which we move around and that may be conceptualized from multiple views, which are put together (mentally) like a jigsaw puzzle. To put it differently, it is the level of granularity that coincides with the mesoscopic stratum of spatial reality. (The other stratum is the microphysical one that may be conceived as a complex edifice of molecules). The mesoscopic stratum is the real-world counterpart of our nonscientific cognition and action in space, and has three different types of components:

1. objects of a physical sort (such as rivers, forests, seas) that are studied also by physics but which, within the mesoscopic stratum, have different sorts of

properties—this is in virtue of the fact that our naive cognition endows its objects with qualitative rather than quantitative features and with a social and cultural significance that is absent from the microphysical realm;

2. objects like bays and promontories, which are also in a sense parts of the physical world but exist only in virtue of demarcations induced by human cognition and action;
3. geopolitical objects such as nations and neighbourhoods that are more than physical, and which exist only as the hybrid spatial products of human cognition and action (Smith and Mark 1998, p. 313).

However, also with these clarifications, some issues remain unsolved. In particular, which maps should we properly refer to? What is the minimum level of granularity for a map that represents exclusively geographic entities? What is the difference between geographic and manipulable objects? Such questions seem to reveal some limits of the correspondence between the notions of ‘being portrayed on maps’ and ‘geographical entity’, highlighting a sort of primacy of the latter notion (or, at least, of the evaluation of what is properly geographic) over the notion of ‘being portrayed on maps’. But then, how to distinguish between what is a geographical entity from what is not?

On *What* and *Where*

The theory of spatial location investigates the relation between geographical entities and the regions of space they occupy or in which they are located. According to Casati et al. (1998), specifying such a relation also means choosing, in term of representation, between classical and non-classical geographies.⁶

Classical geography assumes that every single geographic entity is located at some unique spatial region and that every spatial region has a unique geographic entity located at it. Consequently, it defines the relation between geographical entities and the regions they occupy in terms of identity. As stated by Bishr (2007), such an identity relation also constitutes a fundamental premise of GIS and geo-ontologies, according to which a (geographical) object must have some location, even if the location can be arbitrary. In contrast, non-classical geographies consider that the relation in question is not one of identity. That means the possibility of geographical entities that are not located somewhere, of spatial regions with two or more geographical entities located at them and/or without entities on them. In other words, it licenses:

- on the one hand, nonspatial geographical entities, entities with multiple location or duplicates of the same geographical entity;

⁶Among the most significant works that investigate the notion of ‘classical geography’ in a more geographical sense and analyze its relations with the concepts of spatial location and representation in a totally different perspective than what is being discussed here, see: Lukermann (1961), Geus and Thiering (2014).

- on the other hand, maps with regions that are assigned no entity, or two or more competing units.

By discussing the relation between what and where, the theory of spatial locations also allows not to consider geographical objects as larger versions of the everyday objects and kinds studied in cognitive science. Indeed, according to Smith and Mark (1998), geographic objects are not merely located in space, as are the manipulable objects of table-top space or roughly human scale such as birds, pets, toys and other similar phenomena. For such entities, the ‘what’ and the ‘where’ are almost independent. On the contrary, in the geographic world, the ‘what’ and the ‘where’ are intimately intertwined. To be more precise, geographical objects are tied intrinsically to space, in a manner that implies that they inherit from space many of its structural (mereological, topological, geometrical) properties. Obviously, that is not the only difference. According to the authors, geographic reality comprehends mesoscopic entities, many of which are best viewed as shadows cast onto the spatial plane by human reasoning and language (and by the associated activities). Because of this, geographic categories are much more likely to show cultural differences in category definitions than are the manipulable objects of table-top space. Furthermore,

In the geographic world, categorization is also very often size- or scale-dependent [...]. In the geographic world, to a much greater extent than in the world of table-top space, the realization that a thing exists at all may have individual or cultural variability. In the geographic world, too, the boundaries of the objects with which we have to deal are themselves salient phenomena for purposes of categorization. [...] Moreover, the identification of what a thing is may influence the location and structure of the boundary (Smith and Mark 1998, p. 309).

Drawing the Contour

Another strategy for the identification and the individuation of (autonomous) geographical entities starts with the specification of their boundaries, in terms of location and typology. To be more precise, the strategy consists in sketching a taxonomy of boundaries, from which it may derive a corresponding categorization of the different sorts of geographical entities that boundaries determine and/or demarcate.⁷ The basic idea is that an analysis on (and a classification of) geographical boundaries might be functional for determining what kinds of geographic entities exist and have to be included as fundamental.

Smith (1995) and Galton (2003) have provided the two most cited examples of comprehensive classifications of geographical boundaries in the geo-ontological domain. Both the classifications take the form of a hierarchical tree structure with a top-level distinction, which is considered, by the authors, as absolute, exhaustive and mutually exclusive. Galton distinguishes between institutional and physical boundaries. Such a distinction is the result of the different distribution of matter and energy

⁷Cfr. Smith (1995), Smith and Varzi (1997), Casati et al. (1998), Smith and Mark (1998), Smith and Varzi (2000), Galton (2003).

in space and time, from which the existence of boundaries depends. For institutional boundaries, the dependence of the boundary on the material facts is mediated by individual or collective human intentionality. For physical boundaries, there is not such a mediation. Conversely, Smith's main distinction is between *bona fide* and *fiat* boundaries. *Bona fide* boundaries exist even in the absence of all delineating or conceptualizing activity on our part, independently of all human cognitive acts and demarcations. On the contrary, the existence of the *fiat* boundaries depends on our delineating or conceptualizing activity. Despite the two authors do not share the same terminology, the examples they use for the entities belonging to such categories seem to indicate an overlap between the distinctions above. Indeed, both the authors include entities such as coasts, river banks, seabords, among the prototypical examples of *bona fide*/physical boundaries. In contrast, entities like political and administrative boundaries, state and provincial borders, property lines and borders of postal districts provide examples of *fiat*/institutional boundaries.

Now, the main issue arising from this strategy concerns whether we can really affirm that the notion of boundary is, in some way, prior to the notion of geographical entity. If no, we might, in principle, assume the existence of geographical entities without boundaries. Consequently, such a position can hardly be considered as exhaustive in providing a complete inventory of geographical entities. If yes, we should analyze the ontological status of (geographical) boundaries and (maybe) choose whether:

- to consider them as higher order entities as some eliminativist theories do (cfr. Section “[Boundaries](#)”);
- or, conversely, to include them within the list of geographical entities (as mountains, rivers, cities are).

The latter option requires to explain how a class (or a sub-class) of geographical entities can play a normative role in the definition of such entities, avoiding a *petitio principii*.

Another issue might arise from the claim of exhaustiveness of the taxonomies above, which should not appear as a restriction for the existence of other kinds of geographical boundaries. On one side, we should consider a certain degree of arbitrariness regarding both what is categorized and how it can be categorized. In this sense, also the functions of boundaries that we want to categorize might assume a significant role. On the other side, we could also change the classification system (or propose a new one) and then some of our boundaries might move, some of them disappear, new ones might have to be created. Moreover, it is important to remember that the natural language (and its evolution over time) and, more generally, cultural diversities in addition to human beliefs have contributed (and still contribute) to the categorization and the generation of (new kinds of) boundaries.

Finally, paraphrasing the words of Galton, even the distinctions purposed can be not entirely clear-cut and some cases can be classified in different ways depending on how they are interpreted. On the one hand, we may find intermediate cases, which seem to occupy a middle ground between two positions in the classification (Galton 2003, p. 152). On the other hand, there can be several cases in which a boundary of

one type can evolve into or give rise to a boundary of another type and vice versa (Galton 2003, p. 159).

Cultural (Geographical) Entities

As Smith and Mark (1998) have remarked, we should also consider that geographic entities (and, more in general, geographic subdivisions) might involve a degree of human-contributed arbitrariness that is generally marked by differences in the ways different languages (and their evolutions over time), beliefs and, in particular, cultures structure or slice our world. According to the authors, such (cultural) differences might act differently depending on the entities we want to categorize:

- bona fide entities (seas, mountains, lakes, deserts) are more likely to be objects of categorizations that enjoy a high degree of cross-cultural invariance;
- fiat entities (nations, provinces, postal districts), in contrast, as far as they are inculcated into the world by cognition, are more likely to show cultural dependence.

Accepting that some geographical entities (included in our categorizations) might be, in some way, culturally influenced may leave the door open to the introduction of:

- cultural (geographical) entities in our classifications;
- (as well as) categorizations of geographical entities which (in turn) may have an influence on cultural diversities, human beliefs and individual or collective behaviours.

With regard to the first point, we should also consider that the modalities through which cultural differences might influence the classification of the geographical entities (and vice versa) operate, at least, at three different levels that should not be (improperly) equate. To be more specific, by using the notion of geographical boundaries, we can specify that cultural dependency⁸ can occur, at least, at the following level:

1. the *definition of geographical boundaries* that determines what should be included in (the full list of entities belonging to) our classification;
2. the identification of (some) *different kinds of boundaries*, which determines the classes of our taxonomy—for example, the inclusion of the ‘property boundaries’ in our taxonomy is determined by the acceptance of the notion of property. In contrast, such boundaries will disappear in a society that does not know/accept the concept of property;

⁸Obviously, the study of the (mutual) relation between geographical boundaries and cultural elements is not unique to ontological analysis, but it is, for example, one of the main assumptions of border studies—according to which boundaries are generally understood as social constructs rather than being naturally given entities. In this respect, see for example: Kolossov (2005), Newman (2006), Agnew (2008), Newman (2010), Kolossov and Scott (2013), Paasi (2013a, b), Yachin (2015).

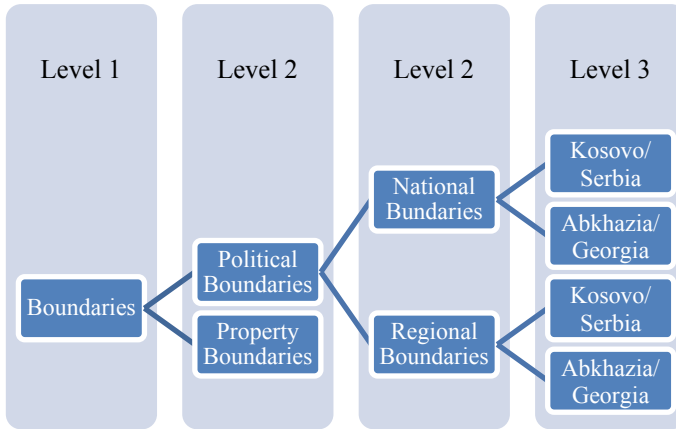


Fig. 9.1 Levels of cultural dependency

- the *categorization of a specific boundary* within the different classes of boundaries previously identified/accepted, i.e. the boundary between Abkhazia and Georgia that, without taking into account other possible alternatives, can be regarded as a national or a regional one, according to our culture and/or beliefs⁹ (Fig. 9.1).

GIS, Knowledge Engineering and Geographic Objects

If most of the approaches and considerations above generally adopt a speculative viewpoint, the perspective of Laurini (2017) is just to describe the notion of geographical object within the (applied) domain of GIS and knowledge engineering. In this context, the author maintains that any geographic object should have:

- an ID named GeoID, which will be an identifier only used for storing;
- a geographic type;
- a geometric shape (the most accurate possible)—and when necessary other less accurate representations will be derived quickly by using generalization algorithms;
- zero, one or many different toponyms;

⁹A similar example is provided by the recognition, among others, of Kosovo and Pridnestrovian Moldavian Republic, which is supported only by some (or none) of the members of the United Nations. In other words, some members of the UN might consider Kosovo and Pridnestrovian Moldavian Republic as proper nations, while other members do not. Consequently, the categorization of these entities changes according to the member of UN that classifies them. Of course, the concept of recognition is neither a prerogative of the United Nations nor of the notion of nation. On the contrary, it may be applied to, in principle, other geographical notions and/or institutions. See, for example, Italy with Lunezia (section “[On Nonexistent and Abstract Geographical Entities](#)”).

- links with other geographical objects by spatial or geographic relations or even by structures.

Such a list extends and specifies the three different facets that, according to the author, characterize the peculiarity of geographical objects within such a domain: geometry, identification and semantic.

By their geometric facet, Laurini distinguishes two main categories of geographical objects:

- crisp objects that have well-defined boundaries such as administrative objects (countries, regions, natural parks, etc.) and manmade objects (streets, buildings, and so forth);
- (and) fuzzy objects which have undetermined boundaries (mountains, marshes, deserts, etc.).

The first category of geographical objects might be represented by using conventional geometry (that should also take in account issues coming from the curvature of the Earth), whereas the second one requires models deriving from fuzzy sets.

From the point of view of identification, Laurini maintains that geographic objects can have names, sometimes several names and that the same name might also be assigned to various different entities. The introduction of gazetteers and computer identifies (IDs) allows us to solve some ambiguities arising from toponymy, even though in different databases the same features can have different identifiers.

Finally, due to their semantics, geographical objects might be considered as conventional objects. However, some issues can emerge from the fact that different languages might:

- confer different names to the same geographical entity (for example, Mount Everest is known in Nepali as Sagarmāthā and in Tibetan as Chomolungma);
- (and in particular) use different categories for the geographic kind within which a specific entity is classified (for example, the geographic kind ‘river’ has two translations in French: ‘fleuve’ when a river flows to the sea, ‘rivière’ in any other circumstance).

Rivers, *Fleuves* and *Revières*

Considering conventional objects, we have already said that geographic categorizations can be marked by differences in the ways different languages slice the world (section “**Cultural (Geographical) Entities**”). “Terms like ‘strait’ and ‘river’ represent, in this sense, arbitrary partitions of the world of water bodies. The English language might have evolved with just one term, or three terms, comprehending the range of phenomena stretching between strait and river or, in French, between ‘detroit’ and ‘fleuve’” (Smith and Mark 1998, p. 317).

Different languages might also contain different categories for the classification of the geographical entities. Taking the example of the previous paragraph, the geo-

graphical kind ‘river’ has indeed two translations in French: ‘fleuve’ when a river flows to the sea, ‘rivière’ for all the other rivers. “Notice that there is a topological relation between ‘fleuve’ and sea, and between ‘fleuve’ and ‘rivière’, whereas ‘river’ does not bear this kind of relation” (Laurini 2017, p. 62). Therefore, the Tiber might belong to two different categories, namely ‘river’ and ‘fleuve’, according to whether the native language of the person who categorizes such an entity is, respectively, English or French. By using the same example, another issue may emerge if a French speaker sees a natural flowing watercourse not knowing its topological relations: in this case, is he seeing a fleuve or a rivière? Maybe, we should point out that any categorization, in general, seems to require a good knowledge of the domain we want to categorize.

Moreover, in light of these considerations, we need to specify whether different languages require different classifications—since concepts can be different or differently organized. If they do, the challenge concerns how to match such different classifications of the same (geographical) domain. On the contrary, if they do not, we should select a language for our classification, consider the possibility of integrating translations in different languages, and try not to lose the conceptual richness emerging from different languages. For example, a classification of water bodies in English will lose the topological relations expressed by the (French) dichotomy between fleuve and rivière.

Danube, *Donau* and *Дунай*

If the considerations expressed in the previous paragraph are generally focused on common names, we should now consider that some geographical entities have proper ones. In the realm of physical geography, only few points have proper names, such as the North and the South Poles and some mountain summits, few lines, such as the Equator, the Tropic of Cancer, the Tropic of Capricorn, the Greenwich Meridian, the Polar Circle, and some solids such as lakes, seas, oceans and so forth. Conversely, within the human geography the list of proper names is so long that we may look at the discipline as the realm of geographical proper names. Such names might give rise to a number of conundrums on toponymy, which can also be interesting for the debate on geographical entities. According to Laurini (2017), the conundrums might regard:

- homonymy—the fact that a proper name can be the name of two (or more) different geographical entities (i.e. ‘Mississippi’ is the name of a river and of a state);
- endonym/toponym—the former is the local name in the official language of the country or in a well-established language occurring in that area where the feature is located (i.e. Venezia in Italian). However, potentially every geographical entity may also have different names (several toponyms) in countries with different official languages (i.e. Brussel in Flemish, Bruxelles in French);

- exonym, which is a name in languages other than the official one (i.e. Venice in English or Venice in French);
- archeonym that is a name that existed in the past (i.e. Byzantium and Constantinople for Istanbul);
- abbreviations (L.A. for Los Angeles) and nicknames (Big Apple for New York);
- place with multiple names (i.e. in New York City, the ‘Sixth Avenue’ is also known as ‘Avenue of the Americas’);
- variations about the way to write some names (i.e. 3rd Street, Third Street, Third St);
- transcriptions, for example, Peking became Beijing after a change of transcription to the Roman alphabet, but the capital of China has not modified its name in Chinese.

If the Laurini’s list (and examples) is still not enough, we might add, for example, the case of the river ‘Danube’ that assumes different names in the different countries it crosses: ‘Donau’ in Germany and Austria, ‘Dunaj’ in Slovakia, ‘Duna’ in Hungary, ‘Dunav’ in Croatia and Serbia, ‘Dunav’ and ‘Дунав’ in Bulgaria, ‘Dunărea’ in Romania and in Moldova and ‘Dunaj’ and ‘Дунай’ in the Ukraine. So, what is the proper name of the river? May we assign a name to that river as a whole? If no, is the name of such a river composed by the sum of the names given by the ten nations that it flow through? Or again, which is the name of the river when it separates two different nations? Should we maybe think that the river is composed of different parts, each of which has a different proper name? More in general, might the case of Danube (as well as the previous examples) involve some sort of vagueness in the (linguistic) referent and/or in the entity/ies in question?

Vagueness

Considering the vagueness not only as a pervasive phenomenon of human thought but also of the geographical world is up for discussion in the current geo-ontological debate.¹⁰ According to Varzi (2001), virtually every geographic word and concept suffers from it, and questions such as ‘How small can a town be?’, ‘Where does a hill begin?’, ‘How long must a river be?’ and ‘How many islands does it take to have an archipelago?’ are perfectly legitimate. Moreover, vagueness is not exclusive to common name: the name ‘Everest’, for example, is just as vague as mountains, hills, towns and so forth can be, giving rise to its own kind of soritical paradox.

In the same article, the author distinguishes two main different kinds of vagueness: *de re* and *de dicto*.

In line with the former, the vagueness exhibited by geographic names and descriptions should be conceived as ontological, and not as purely epistemic. Accordingly “a vague term is one that refers to a vague object, an object the spatial or temporal

¹⁰See Mandelbrot (1967), Sarjakoski (1996), McGee (1997), Bennett (2001), Varzi (2001).

boundaries of which are genuinely ‘fuzzy’”. Therefore, the name ‘Everest’ is vague insofar as the entity Everest is vague:

there is no objective, determinate fact of the matter about whether the borderline hunks are inside or outside the mountain called ‘Everest’. The same applies to deserts, lakes, islands, rivers, forests, bays, streets, neighborhoods, and many other sorts of geographic entities. On the *de re* reading, these entities have vague names because they are genuinely vague denizens of reality (Varzi 2001, p. 52).

Conversely, the *de dicto* (semantic) reading maintains that geographic vagueness “lies in the representation system (our language, our conceptual apparatus) and not in the represented entity”. In other words, “to say that the referent of a geographic term is not sharply demarcated is to say that the term vaguely designates an object, not that it designates a vague object”. Accordingly, there is no such thing as a vague mountain. Rather, there are many things where we conceive a mountain to be, each with its precise boundary, and when we say ‘Everest’ we are just being vague as to which thing we are referring to. That is to say that there are several different “ways of tracing the geographic limits of Mount Everest, all perfectly compatible with the way the name is used in ordinary circumstances”. In the end, each one of a large variety of slightly distinct aggregates of molecules has an equal claim to being the referent of the vague name ‘Everest’. And each such thing is precisely determinate (Varzi 2001, p. 54–55).

(Geographical) Kinds and Properties

In these pages, the term ‘entity’ has been generally used as synonym of ‘object’ for indicating, in the realm of geography, something like regions, parcels of land, water bodies, roads, buildings, bridges, and so on, as well as parts and aggregates of all these things. However, the association between entity and object risks to be too restrictive for the description of the geographic domain insofar as such a domain may also comprehend other sorts of entities like kinds, properties, relations, boundaries, events, processes, qualities and so forth.

Geographical kinds, for example, tell us under which category an object falls, in other words: what an object is. For instance, if we consider the following three sentences:

1. Nile is a river
2. Bucharest is a city
3. Everest is a mountain

the terms ‘river’, ‘city’ and ‘mountain’ represent three (possible) examples of geographical kinds that have objects, respectively, Nile, Bucharest, and Everest, as their instances. Generally speaking, Rosch has proposed that (natural) kinds are seen as possessing a radial structure, having prototypes of more central or typical members surrounded by a penumbra of less central or less typical instances (Rosch 1973,

1978). In the geographical domain, Casati et al. (1998) have also emphasized that the entities to which geographers refer are of a different kind and can be distinguished in two main categories, corresponding to the traditional distinction between physical and human geography. On the one hand, there are mountains, rivers, deserts. On the other hand, there are socioeconomic units: nations, cities, real-estate subdivisions—the spatial shadows cast by different sorts of systematically organized human activity. The correspondence between (these two) branches of geography (human and physical) and different sorts of geographical kinds seems to support the idea that, in principle, each different branch (and subbranch) of geography might be characterized by specific sorts of geographical kinds.

Finally, we should consider that geographical kinds and objects might also be characterized by (geographical) properties: that are entities which can be predicated of objects and kinds or attributed to them (Orilia and Swoyer 2017). Examples of geographical properties may be ‘has a population of’, ‘has a catchment area of’ and so forth. In addition to expressing what things are said to bear, possess or exemplified, the examples help us in the categorization of different geographical kinds and objects. For instance, the property ‘elevation’ (as well as ‘volume’, ‘relief’, etc.) might help us in categorizing a landforms as a mountain, a hill and so forth.

Relations, Fields and Time

In addition to kinds and properties, our list of geographical entities can also comprehend items such as relations, which, in turn, might be divided into the following:

- Mereological,¹¹ Topological,¹² spatial¹³ relations;
- (as well as) different sorts of mixed cases of relations among geographical objects.¹⁴

But, how may we consider a relation as properly geographic? Is there a difference, for example, between spatial and geographic relations? According to Laurini, despite such a difference might be not so clear-cut, “we can say that spatial relations are seen more abstract whereas geographic relations are grounded in the Earth” that is, link two or more objects located in the Earth (Laurini 2017, p. 83). Obviously, this does not mean that also spatial relations are not commonly used in the geographical

¹¹ It is the relation ‘is a part of’ that can also include some temporal parameters which help to specify the criteria of identity for the entities and their constitutive parts. See Simons (1987), Smith and Mark (1998), Casati and Varzi (1999), Mark et al. (1999).

¹² Examples of topological relations are connection, overlapping, containment, distance, separation, discontinuity and so on. See Smith (1994, 1995, 1996), Varzi (2007).

¹³ In general, spatial relations might be conceived as relations between objects and the regions of space they occupy or in which they are located. See Casati et al. (1998).

¹⁴ For example, the mereotopology that is the connection between mereology and topology (Smith 1995; Breyse and De Glas 2007), or again the relation between the notions of topology and border (Casati et al. 1998; Smith and Varzi 2000; Varzi 2007).

domain, even if they can be used also in other domains such as robotics, medical imagery, etc. Examples of geographical relations can be the relation ‘is a north/south of’, as well as specific connections between geographical objects such as rivers (‘is tributary of’), roads (‘crosses’), city and country (‘is the capital of’) and so forth.

(Geographical) continuous fields represent another ontological conundrum in the domain of geographical entities. Indeed, on the one hand, we have the position of Smith and Mark (1998), according to which an adequate ontology of geographic kinds should embrace not only categories of discreta but also *categories* that arise in the realm of continuous phenomena. On the other hand, Laurini (2017) says that the introduction of a theory of continuous fields might help us especially in *representing* continuous phenomena such as temperature, pressure, wind, elevation or air pollution, which can be matters of geographical interest. This also means to underline that, particularly with geographic information systems (GIS), “there is also conceptual interaction with geographical entities that is mediated through mathematical models and through computer representations” (Smith and Mark 1998, p. 312). Now, if the point concerns whether to consider (continuous) fields as properly geographical *entities* or *tools* involved in the representation of geographical entities, such a doubt seems to involve the relation between the geographical reality and the tools that help to describe it. In other words, should we include also such tools or, more in general, entities coming from the domain of geographic representation in our list of geographical entities?

Finally, we should also spend a few words on the dimension of time, thus avoiding to consider the geographic reality in a static perspective. This means not only contemplating the diachronic and synchronic identity of geographic entities but also, according to Egenhofer and Mark (1995), regarding geographic space and time as tightly coupled. For instance:

Many cultures have pre-metric units of area that are based on effort over time (Kula 1983). The English *acre* (Jones 1963; Zupko 1968, 1977), the German *morgen* (Kennelly 1928), and the French *arpent* (Zupko 1978) all are based on the amount of land that a person with a yoke of oxen or a horse can plow in one day or one morning. There have been similar measures for distance, such as how far a person can walk in an hour, or how far an army can march in a day (Egenhofer and Mark 1995, p. 7).

Boundaries

As stated in Section “[Drawing the Contour](#)”, one of the many approaches to identify geographical entities starts with the specification of their boundaries. But what are geographical boundaries? What is their relation to the entities they demarcate? Is it mereological? Might boundaries exist also without the entities they separate? Should we include them in our list of geographical entities?

Without claiming to be exhaustive, we can say that the geo-ontological debate¹⁵ has generally distinguished two main sorts of theories on (geographical) boundaries: realist and eliminativist theories (Varzi 2015). Realist theories consider boundaries as lower dimensional entities: boundaries are ontological parasites, which cannot be separated and exist in isolation from the entities they bound. Realist theories may differ significantly, however, with regard to how such dependent, lower dimensional entities relate to the extended entities they bound. With reference to the boundary between Maryland and Pennsylvania, Varzi has distinguished four main views of such theories:

1. the first view maintains that the boundary may belong neither to Maryland nor to Pennsylvania;
2. according to the second one, the boundary must belong either to Maryland or to Pennsylvania, though it may be indeterminate to which of the two states it belongs;
3. the third says that the boundary may belong both to Maryland and to Pennsylvania, “but the relevant overlap is *sui generis* precisely insofar as it involves lower dimensional parts. Boundaries do not *take up* space and so, on this theory, it is not implausible to say that (for example) the Mason–Dixon line belongs to both Maryland and Pennsylvania”;
4. the last one maintains that there really may be two boundaries, one belonging to Maryland and one belonging to Pennsylvania, “and these two boundaries would be co-located—that is, they would coincide spatially without overlapping mereologically” (Varzi 2015).

Conversely, eliminativist theories move from the idea that talking of boundaries involves some sort of abstraction. Among such theories, substantialists about space–time “see the abstraction as stemming from the relationship between a particular and its spatiotemporal receptacle, relying on the topology of space-time to account for our boundary talk when it comes to specific cases”. If one is not a substantialist about space and/or time, one can describe the abstraction as invoking the idea of ever thinner layers of the bounded entity. On this account, “boundary elements are not included among the primary entities, which only comprise extended bodies, but they are nonetheless retrieved as higher order entities, viz. as equivalence classes of convergent series of nested bodies” (Varzi 2015).

On Nonexistent and Abstract Geographical Entities

On Tuesday 5 July 1955, the Australian newspaper *The Age* wrote that the Philippine Air Force was searching the South China Sea for a mysterious island settlement

¹⁵See for example Mark and Csillag (1989), Smith (1995), Burrough and Frank (1996), Zimmerman (1996), Smith and Varzi (1997, 2000), Casati et al. (1998), Smith and Mark (1998), Casati and Varzi (1999), Varzi (2007, 2016), Russell (2008).

called the *Kingdom of Humanity*. The reason for this mission was that the Philippines President wanted to know whether such a place actually existed. If that had been, the Philippines President wanted to determine whether it was a legitimate settlement within the territorial Philippines (Middleton 2015). But, if that was not the case, could we have been included the *Kingdom of Humanity* within the list of geographical entities? In other words, does the notion of existence determine what we can legitimately consider as a geographical entity?

Another example may be represented by Lunezia, a geographical region that is meant to include the Italian provinces of La Spezia, Massa-Carrara, Parma, Piacenza, Reggio nell'Emilia, Mantua and part of the territories of Cremona and Lucca. As from 1946, the debate on the possible constitution of Lunezia has not (yet) led to the institution of such a geographical region. But, does the (ongoing) debate legitimize the inclusion of Lunezia within the geographical entities? Or does the fact that Lunezia never had a spatiotemporal existence on the Earth exclude such an entity from the realm of geographical entities?

If all those conundrums are not enough, let's go back to the Era of Partition, when Poland did not have a spatial location—or rather, when Poland did not have any territory to call as its own land. Now, should we include Poland among the geographical entities also in that era? More precisely, if we wanted to carry out an inventory of geographical entities of that period, does the fact the Poland did not have a territory (or a spatiotemporal existence during such an era) allow us to exclude Poland from that inventory? If no, we could include, within the list of geographical entities, also entities that has not (and maybe that will no longer have) a spatial location, such as the Holy Roman Empire or the Maritime Republics,—and (maybe) entities such as Kosovo, Timor Est and South Sudan, which had not (yet) had a spatiotemporal existence during that period of time. If yes, we should perhaps justify how, for example, a non-geographical entity can give the right to (re)claim a territory as its own land, such as Poland after the Era of Partition or nowadays with Kurdistan.

Historical Entities

Until McCarthy completed his work, Siamese provinces were not geographically well-described. A province existed in a particular place but the place did not define it. The land itself was almost coincidental. What mattered were the people. And where a boundary did exist, it was seldom a continuous line. It wasn't even a zone. In fact it only occurred where it was needed, such as along a track or pass used by travellers. In other places, where people seldom set foot, there was no point in deciding a boundary. Further, borders between adjacent kingdoms did not necessarily touch, often leaving large unclaimed regions of forest, jungle or mountains. And in practice it was quite possible for towns to have multiple hierarchical relations of authority with more than one ruler and hence – disturbingly for Mr McCarthy – to be part of more than one state (Middleton 2015).

In Section “**Cultural (Geographical) Entities**”, it has been said that different cultural frameworks (as well as different languages and beliefs) may describe the same geographical reality in diverse ways, in terms of categorizations, entities, boundaries,

and so forth. That means that cultural environment plays a fundamental role in determining our list of geographical entities. However, we should also remark that such a cultural framework does not change only on the basis of the geographical context. Indeed, also the advancements of geography as a discipline and the historical context can have a strong influence on it.

About the influence of the historical context—besides the case of Siamese provinces provided by Middleton—we can, for example, consider if there is a difference between contemporary (military) encampments and Roman *Castra* (or *Hiberna*)—regardless of whether or not *Castra* had become cities. So, should we include such entities in our geographical inventory? Do contemporary military encampments and Roman *Castra* represent the same geographical entity? Another issue might arise from territories occupied by nomadic populations, which could change according to seasons, food resources and so forth. In this case, we could ask is there a geographical entity defined by the territory occupied by a population in a specific period of time, even if that population had no ongoing territory to call as its own land? If yes, may it be an entity that describes the ancient world but not the contemporary one? More generally, do we use the same geographical concepts that, for example, Greek and/or Roman used? Had the notion of boundaries the same meaning that it has today? Did, for example, the term *Gaul* denote a crisp region with clear-cut boundaries or rather the territory occupied by Celtic tribes with de vague boundaries?

To conclude, we should consider mythological places such as Atlantis, Biringan City, Cloud cuckoo land, Paititi and Mu. Are they geographical entities, at least for some cultures in certain period of time? If yes, should we include them in our list of geographical entities? Just to add further hurdles, we might also consider the puzzling case of Thule and the several theories about its possible location, which include, among others, the coastline of Norway, Iceland, Greenland, Orkney, Shetland, Faroe Islands and Saaremaa. Obviously, if we imagine a map that shows all these locations, then we would be hardly inclined to consider Thule as the mereological sum of all the locations ascribed to it. At the same time, it would be unlikely to consider the various Thule represented on the map (with different conditions of identity) as duplicates of the same geographical entity. Perhaps, we could take the various points that locate Thule on that map as indicating different geographical entities, to which different authors have attributed the same connotation. Perhaps, we could also consider the possibility of geographical entities with multiple locations.

Complex Geographical Entities

Generally, geographic objects are complex entities: that is, they have proper parts and/or components. Moreover, geographic objects can be connected or contiguous, but they can also be scattered or separated. Sometimes they are closed (e.g. lakes), and some others are open (e.g. bays). Note that the above concepts of contiguity and closure are topological notions, and thus an adequate ontology of geographic objects

must contain also a topology, a theory of boundaries and interiors, of connectedness and separation, that is integrated with a theory of parts and wholes, or mereology (Smith 1996).

To say that some geographical entities may be complex means that such entities are made up by other geographical entities: for example, a nation can be divided into regions, provinces and so forth, a city can contain geographical entities such as buildings, streets and so on. They can all be seen either from a mereological approach (part/whole relations) or from a topological point of view (contain relation). However, we should remark that a geographical entity might also have components which are not strictly geographical. To put it clear, if a geographical entity such as a forest might be defined a large area covered chiefly with trees and undergrowth, may we consider these trees, their leaves, roots and atoms as geographical entities? Moreover, a geographical entity such a forest might also have (arbitrary) spatial parts: for example, the north side of the forest and the south one. But then, should we include such spatial parts within our list of geographical entities?

Another point to mention is that the hierarchical structure exhibited by, for example, the relations between a nation with its regions, administrative subdivisions and so forth is not the only possible structure that geographical entities might show. Indeed, according to Laurini, as there are different kinds of roads, turnpikes, streets, etc. seldom a sort of hierarchy can be defined. Moreover, some geographical entities can contain specific parts of other geographical entities. In other words, a geographical entity may, in principle, belong to two or more different geographical entities, which makes it difficult to think about a hierarchical structure. For example, Via Emilia (SS 9) crosses different Italian provinces such as, among others, Rimini, Bologna, Reggio nell'Emilia, Parma. Furthermore, a geographical entity may also belong to two or more different hierarchies that, for instance, describe different branches of geography (as a discipline). In this sense, also hierarchies can presuppose overlaps. For example, Lake Iseo can be seen as an instance of the class Lakes that, in turn, is a subclass of the class Water Bodies (physical geography). At the same time, Lake Iseo can be considered as belonging to the region Lombardy that in turn is a proper part of the nation Italy and so forth (political geography). However, we should not forget that the presence of a hierarchy does not exclude eventual relations among classes at the same level or belonging to different branches of the same hierarchy (Bittner and Smith 2008).

Hierarchical Structures

To talk about (geographical) hierarchies, it may be useful to introduce the meaning of two different terms that I use in this paragraph: *hyperonym* and *hyponym*. The two terms are the (opposite) names of places with a hierarchy: for instance, Europe is a hyperonym of Italy, whereas Italy is a hyponym of Europe (Laurini 2017). In contrast, a *meronym* may be considered as a name of a part of a place without a hierarchy: for instance, the Adriatic Sea is a meronym of the Mediterranean Sea.

Now, could we benefit from thinking in terms of hierarchy in distinguishing between what is geographical and what is not? Perhaps, we should first consider whether or not the hierarchy can be inclusive for all the geographical entities in our list. Accordingly, the point might be to circumscribe such a hierarchy, starting from the top hyperonym and lowest hyponyms.

About the top hyperonym, a fundamental question might be: is there something geographic to which anything uncontentiously belongs? Semantically speaking—given that the term geography comes from the Greek words *gê* (‘Earth’) and *graphein* (‘to write, draw’) and thus it means ‘to write and draw about the Earth’—a possible answer can be the Earth: every geographical entity belongs to the all-inclusive geographical entity *Earth*. Now, if such an answer may have some supporters, we should, however, pay attention to, at least, two different issues. The first one is to keep geography from collapsing into its cartographical dimension (or better, to do not reduce geography to cartography). The second issue, strictly related with the first one, concerns the fact that geography is also devoted to the study of human activities, cultures, economies, interaction with the environment and relations with and across space and place. Of course, such human dynamics can have effects on the Earth, by producing something that can be analyzed through a study of the Earth. However, we can also assume that, despite the fact that human dynamics might have an impact on the Earth, they are something more. Accordingly, the Earth does not complete the entire domain of geography.

Now, what about lowest hyponyms? An idea might be to consider only those geographical entities that are not complex. Consequently, a lowest geographical hyponym (LGH) is a geographical entity that does not contain (or that is not composed by) other geographical entities. (Obviously, that does not mean that a LGH cannot contain other entities, which, in turn, should not be geographic.) However, without a definition of geographical entities a clear-cut identification of a LGH might be difficult. For example, if considering a street as a geographical entity seems to be uncontentious, might we say the same also for shoulders, (emergency, cycle) lanes, roadways of that street? What is/are the LGH(s) in this context? And what if we consider the relation between ponds and lakes? Are ponds hyponym of lakes or are lakes and ponds both categories at the basic level, mainly distinguished by size? What is/are the LGH(s) among a forest and its north and south sides? Finally, we should also consider that LGHs can change according to the different branches of geography we investigate—and consequently every branch of geography might have, in principle, a proper list of geographical entities. For instance, shoulders, roadways and so forth can be seen as potential examples of LGHs for transportation geography but not for health geography; entities such as airports and tracks may be considered as geographic for some branches of human geography but not for classical geography (Luckermann 1961) and so on.

Three Thin Red Lines

The aim of this paper has been to provide a (non-exhaustive) sketch of possible approaches, response attempts, conundrums and issues arising from the question: ‘What is a geographical entity?’. Trying to answer this question is made particularly difficult by the multiplicity of aspects that might influence our answer and defies a clear-cut systematization. Without claiming completeness, we might summarize such aspects as follows.

The first one emerges from the fact that we can use (many) different conceptualizations for describing geographic space. On the one hand, according to Egenhofer and Mark (1995), such conceptualizations of geographic space may:

- reflect the differences between perceptual and cognitive space (Couclelis and Gale 1986);
- be based on different geometrical properties, such as continuous versus discrete (Egenhofer and Herring 1991; Frank and Mark 1991);
- depend on scale or difference in the types of operations we would typically employ in everyday life and/or in scientific reasoning (Zubin 1989).

On the other hand, as I have often remarked in these pages, different conceptualizations of geographical space can also emerge from the ways in which different languages and cultures—as well as the various geographical branches and perspectives—structure and systematize the world itself (Oakes and Price 2008). In this sense, as Smith and Mark (2001) suggest, work involving formal comparisons of geospatial and cartographic data standards and dictionary definitions in a variety of languages might also provide an important starting point for combining quantitative, i.e. measurable geographic phenomena described by different scientific disciplines, with qualitative geographical descriptions of reality also emerging from areas of human-geographical reasoning.

The second factor is that sometimes we may have some difficulties in distinguishing the domain of the real world from the domain of computational and mathematical representations, and both of them from the cognitive domain of reasoning, language, and human action (Smith and Mark 1998). Of course, it might sometimes be difficult to provide a clear-cut distinction between the real world and the tools that we can use to describe it (Laurini 2017). For example, should we consider a compass as a tool capable of describing parts of the geographical world or also as a proper geographical entity? And what about items such as GPS coordinates, longitude, latitude and so forth (Crampton 2010)? Do mathematical entities exist in the geographical world? And geometric ones? And geographical entities which derive from technology? Can GIS enrich our geographical inventory with new kinds of geographical entities?

The third factor concerns geography itself and specifically its development (and/or advancement), which does not only affect geography as a discipline but also the world that it describes. Take for example modifications of boundaries, the formulation of (the notion of) nation-states, the presence of airports on our current maps or, again, the possibilities given by augmented reality for geography. Take also the introduction of

new scholarly fields in geography such as night studies (Gwiazdzinski and Chausson 2015) and border studies (Newman 2006; Kolossov and Scott 2013), or the birth of intellectual movements or paradigm shifts such as the spatial turn (Warf and Arias 2009). Take finally examples that represent potential changes in some parts of contemporary geography (Gomez and Jones 2010) if compared, for instance, to classical geography (Lukermann 1961; Bianchetti 2008), in terms of assumptions, tools, methods of investigation and domain to describe. Now, may we assume that (at least) some of these changes, developments and/or advancements, which introduced new ways of slicing, shaping and interpreting the geographical world, could/can/will create new perspectives for distinguishing between what is geographical and what is not?

From Multiple (Ways of Doing) Geographies to Multiple (Kinds of) Geographical Entities

If yes, as I presume, providing an exhaustive definition of geographical entity (as well as a full list of them) would be made even more difficult, to the point of running the risk of being too restrictive for what a geographical entity could be in the past and will be in the future. For that, although not offering a definition can hardly seem very precise in distinguishing what is geographical from what is not, I think that the possible imprecision of such a definition would be even worse. The issue, in this case, would be to hinder the process of theory-construction, especially for what concerns how best to interpret new (possible) geographical evidence. In other words, the idea is that since geographers (as well as GIS scientists and geo-ontologists) approach the task of theory-construction under the guidance of some ontological assumptions, the greatest contributions of analyzing the notion of geographical entity would be essentially two. The first one is simply to chart the possibilities of existence (Lowe 1989, 2006). The second contribution is providing us with the conceptual tools wherewith to categorize the world's contents in view of the heterogeneity of the geographical debate, trying to keep open minds as to how we might interpret new geographical aims, perspectives and points of view.

Accordingly, the idea behind these pages is that of subordinating every normative claim on the notion of geographical entity to (as well as of enriching our descriptive approaches with) the factors we underlined, which can be summarized as follows. (1) There exist multiple conceptualizations of the geographical world. (2) Different languages and cultures may slice such a world in different ways. (3) The geographical world has changed and will change over time. (4) Also geography (as a discipline) has changed and will change over time, modifying its perspective, tools, domains of investigation and aims. Consequently, what had, has been, will be considered as non-geographic could be considered as geographic, and vice versa. (5) There were, are and will be different kinds of geographies as well as different geographical branches, each of them had, have and might have different tools, aims, points of view

and vocabularies. (6) The introduction of new scholarly fields and new technologies, the birth of intellectual movements or paradigm shifts and developments on other disciplinary contexts (such as geometry, topology and so forth) can/will influence geography as a discipline.

This means that there are multiple, alternative and overlapping views on geographical reality, and the same reality can be represented and sliced in different ways. Accordingly, the aim of the ontology of geography (and of an investigation on the notion of geographical entity) should be to provide some platforms for integrating of such alternative views. Its task is thus practical in nature, and is subject to the same practical constraints experienced in all scientific activity. Consequently, even a geo-ontological framework will always be a partial and imperfect edifice subject to correction and enhancement, so as to meet new scientific needs (Smith and Klagges 2008).

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