Preprint version of paper appearing in
Topoi, 20 (2), 2001, 131-148

Fiat Objects

Barry Smith
Department of Philosophy, Center for Cognitive Science and NCGIA
SUNY at Buffalo (NY), USA

When, in 1784, the land surveyor Thomas Jefferson called into being the states of the so-called Northwest Ordinance by drawing lines on a map, his map was sufficiently inaccurate that it did not even have the Great Lakes in the right places. Ten states would nonetheless eventually be created in the area of Jefferson's map, having boundaries which in large degree follow his original lines. These draw off 14 neat checkerboard squares between the boundaries of the Atlantic colonies and the Mississippi River. As a result of the Northwest Ordinance, which was adopted by Congress in 1785, the land became first of all a Territory of the United States, and the law called for this Territory to be partitioned into mile-square units called sections to be sold at auction at a starting price of $1 per acre.

Figure 1. Thomas Jefferson's Add-a-State Plan (1784)

A number of issues are involved in understanding the peculiar creative magic at work in the performance of such a law. These have to do with the nature of the surveyor's politico-geographical authority, and with the practical and legal problems of translating ink-lines of a certain thickness on paper into working territorial and cadastral borders on the ground. What sorts of entities are these, which can be brought into being simply by drawing lines on a map? What are the forms and limits of such creativity, and how do the created entities relate to entities of the more humdrum sort?

Questions such as these, I submit, can only be answered on the basis of a general theory about the objects of human cognition. Human cognitive acts are directed towards entities of a wide range of different types, and order must be brought into this typological clutter. A categorial scheme that is adequate to this purpose should be (1) critical, that is: it should recognize that cognitive subjects are liable to ontological error, even to systematic error of the sort that is manifested by believers in the Pantheon of Olympian gods. Thus the categorial scheme we are seeking should be such that not all putative object-directed acts are credited with having objects of their own. The scheme should also be (2) realistic: the objects towards which human cognition is directed should be parts of reality, at least in the sense that it should be consistent with the truths of natural science. And the scheme should be, finally, (3) comprehensive: it should do justice to each sort of object on its own terms, and not attempt to eliminate objects of one sort in favor of objects of other, more favored sorts.

Linguistic and other forms of idealism, as well as Meinongian theories, which assign to each and every referring expression or intentional act an object precisely tailored to fit, yield categorial schemes which fail to satisfy (1) and (2). Physicalism, phenomalism, and other forms of reductionism yield categorial schemes which fail to satisfy (3). What follows is a categorial scheme that is designed to satisfy all three of the listed criteria.

1. A Typology of Entities

The starting point for our categorial scheme is the concept of *extended entity*. Two sorts of extended entity are distinguished initially: *objects*, which are extended in space; and *processes*, which are extended in time. Prototypical examples of objects are classical Aristotelian substances or continuants such as you and I, this lump of cheese, the moon. Spatial regions, too, will be included in what follows under the heading of objects. Objects in general are divisible: they can be divided, in reality or in thought, into spatial parts. Examples of processes are: your life, my current head-

ache, the orbit of the moon around the earth. Of course, you and I are in a sense extended not only in space but also in time. But we do not have *temporal parts* in the sense in which lives and headaches and orbits have temporal parts. This, at least, will be the assumption in what follows – sometimes called the assumption of three-dimensionalism – which is adopted here primarily for the sake of simplicity of exposition. Objects and processes can each be conceived as being put together or assembled out of (respectively: spatial and temporal) proper parts.

The suggested categorial scheme now recognizes also the *outer boundaries* of such entities in space and in time. The outer boundary of you is (roughly speaking) the surface of your skin. (We shall return to this 'roughly' below.) The outer boundaries of processes can be divided into *initial* and *terminal* boundaries, respectively (for example the beginning and the ending of a race). Such outer boundaries are included in our taxonomy not least because they are cognitively salient, often no less so than the objects and processes which they are the boundaries of.

All of which leads to an initial scheme for partitioning the objects of human cognition along the lines set forth in Figure 2.

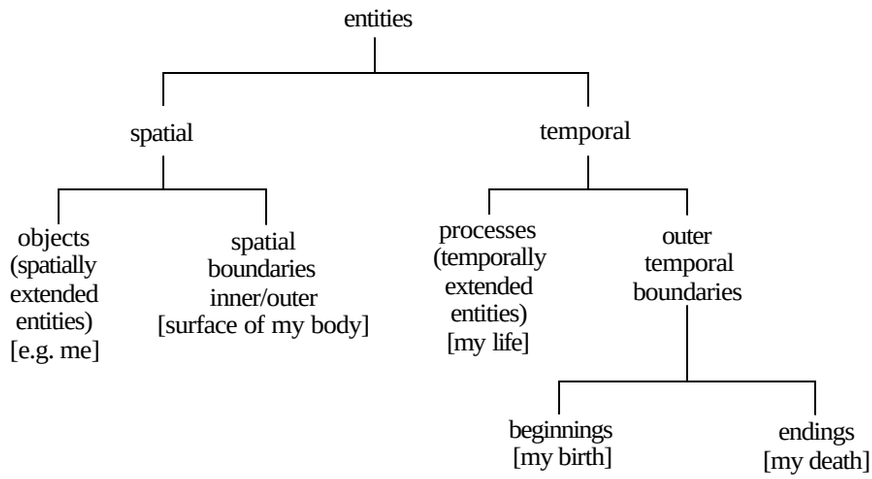

Figure 2: Preliminary Taxonomy of Entities

What, now, of inner boundaries? Imagine a spherical ball made of some perfectly homogeneous metal. There is a sense, surely, in which no genuine inner boundaries can be discerned within the interior of such an object. For the possession of such boundaries presupposes either some interior physical discontinuity or some qualitative heterogeneity among the parts of the object (some sharp gradient of material constitution, color, texture, electric charge, etc.). There are genuine two-

terial constitution, color, texture, electric charge, etc.). There are genuine two-dimensional inner boundaries within the interior of my body in virtue of the qualitative differentiation of my body into organs, cells, molecules, etc. There are also genuine one-dimensional inner boundaries discernible on the *surface* of my body in virtue of its wrinkles, as well as edge-lines around warts, eyes, mouth, surgery-scars, etc. There are no genuine interior boundaries, however, within surfaces or volumes which are homogeneous.

It is clear, however, that we do sometimes speak of inner boundaries even in the absence of such spatial discontinuities and of intrinsic qualitative differentiation. Examples are: the equator, or Bill Clinton's waist,[1] and if punctate boundaries are allowed then also: the North Pole, the midpoint of the sun, the center of mass of my body. Even in relation to a perfectly homogeneous sphere we can talk perfectly sensible of its left and right hemispheres, and so on.

Let us call inner boundaries of the first sort *genuine* or *bona fide* inner boundaries, inner boundaries of the second sort *fiat* inner boundaries. There are, in this terminology, not only *bona fide* joints in reality, but also pseudo-joints, of a type which are to be found for example in the medical divisions, such as that between the upper, middle and lower femur, extensively documented in atlases of surgical anatomy. Figure 3 illustrates the way in which both bona fide and fiat inner boundaries are used in representations of the cerebral cortex in the form of planar maps. Here bona fide boundaries are marked by thicker, curved lines; fiat boundaries by thinner, straight lines.

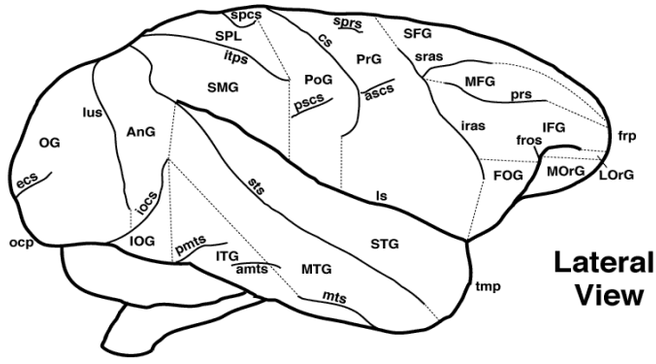

Figure 3: Lateral View of the Cerebral Cortex[2]

Note, in passing, that the opposition between fiat and genuine boundaries is analogous to the opposition drawn by Frege in the *Foundations of Arithmetic* be-

tween the 'objective' and the 'actual' [*wirklich*]:

> The axis of the earth is objective, so is the center of mass of the solar system, but I should not call them actual in the way the earth itself is so. One often calls the equator an *imaginary* line [*gedachte* Linie]; but it would be wrong to call it a *made-up* line [*erdachte* Linie]; it did not come into being through thought, the product of a psychological process, but is only recognized or apprehended by thought. If to be recognized were to be created, then we should be able to say nothing positive about the equator in relation to any time earlier than this alleged creation. (Frege 1884, §26, translation amended)

The term 'fiat' (in the sense of human decision or delineation[3]) is to be taken in a wide sense, as including not only deliberate choice, as when a restaurant owner designates a particular zone of his restaurant a no-smoking area, but also delineations which come about more or less automatically, as when, by looking out across the landscape, I create without further ado that special type of fiat boundary we call the *horizon*. County- and property-lines, postal districts and census tracts provide a wealth of examples of fiat boundaries of the former, deliberate type; we shall see that the realm of human vision is a happy hunting ground for fiat boundaries of the latter, non-deliberate, type.

Fiat boundaries are boundaries which exist only in virtue of the different sorts of demarcations effected cognitively by human beings. Such boundaries may lie entirely skew to all boundaries of the bona fide sort (as in the case of the boundaries of Utah and Wyoming). Some boundaries may, however (as in the case of the boundaries of Indiana or Pennsylvania), involve a combination of fiat and bona fide portions, or indeed they may be constructed entirely out of bona fide portions which however, because they are not themselves intrinsically connected, must be glued together out of heterogeneous portions in fiat fashion in order to yield a boundary that is topologically complete.

Fiat boundaries are boundaries which owe their existence to acts of human decision or fiat, to laws or political decrees, or to related human cognitive phenomena. Fiat boundaries are ontologically dependent upon human fiat. Bona fide boundaries are all other boundaries. They are those boundaries which are independent of human fiat. In this way the exhaustiveness and mutual exclusiveness of the fiat/bona fide dichotomy is guaranteed. This does not mean that the problems associated with the dichotomy are thereby solved, however. Thus there are types of boundary which are difficult to classify under one or other of the two rubrics: exists/does not exist independently of human cognitive acts. Since, however, we have many clear and important cases of boundaries which can be classified unproblematically in terms of this simple dichotomy, I will proceed as if the dichotomy itself were unproblematic.

Almost everything which can be said in terms of the fiat–bona fide dichotomy in the spatial realm has an analogue in the realm of temporal objects (the realm of occurrents, of events, processes, actions, and so on: see Bittner 2000.) Thus we can distinguish two sorts of inner boundary of a process. Examples of genuine inner temporal boundaries – corresponding to some physical discontinuity or intrinsic qualitative differentiation – might be: the point in the flight of the projectile at which it reaches its maximum altitude and begins its descent to earth, the point in the process of cooling of the liquid at which it first begins to solidify, the point in the splitting of an amoeba when one substance suddenly becomes two. Examples of inner boundaries of the second sort might be: the boundary between the fourth and fifth minute of the race, John's reaching the age of three, the scheduled time for the beginning of the meeting. For present purposes however I will concentrate almost exclusively on the spatial realm.

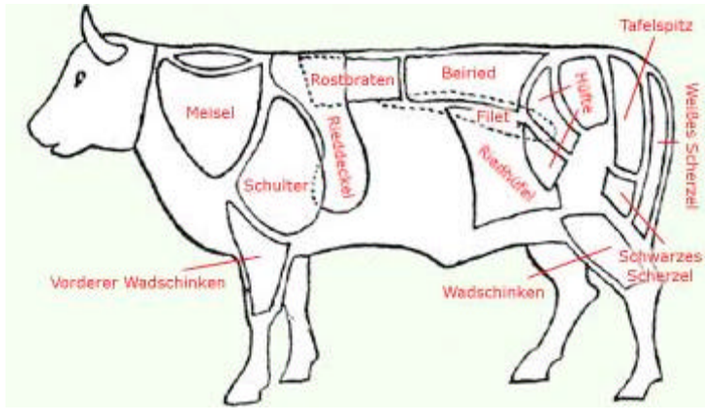

Figure 4. An Austrian Butcher's Chart

2. From Fiat Boundaries to Fiat Objects

The distinction between genuine and fiat boundaries can be carried over, now, to outer boundaries. State borders, as well as county- and property-lines, provide examples of fiat outer boundaries in this sense. This is so where such borders lie skew to the physical joints of reality. Once fiat *outer* boundaries have been recognized, however, then it becomes clear that the genuine–fiat opposition can be drawn not only in relation to boundaries but in relation to *objects* also. Examples of genuine objects are: you and me, tennis balls, the planet earth. Examples of fiat objects are: all non-naturally demarcated geographical entities, including Colorado, the United States, the Northern hemisphere, … and also the North Sea, whose objectivity, as

Frege writes, 'is not affected by the fact that it is a matter of our arbitrary choice which part of all the water on the earth's surface we mark off and elect to call the "North Sea".' (Frege 1884, § 26)

Broadly, it is the drawing of fiat outer boundaries in the spatial realm which yields fiat objects. I say broadly, because again there are cases of objects which ought reasonably to be classified as fiat objects whose boundaries involve a mixture of bona fide and fiat elements.

Just as the drawing of fiat outer boundaries in the spatial realm yields fiat objects, so the drawing of fiat outer boundaries in the temporal realm yields fiat processes: the Renaissance, the Millennium, the Second World War, the Reagan Years, my childhood, etc. All of these are perfectly objective sub-totalities within the totality of all processes making up universal history, even though the spatial reach as well as the initial and terminal boundaries of, for example, the Second World War were decided (in different ways) by fiat.

Our categorial scheme can accordingly be extended, to yield the taxonomy depicted in Figure 5:

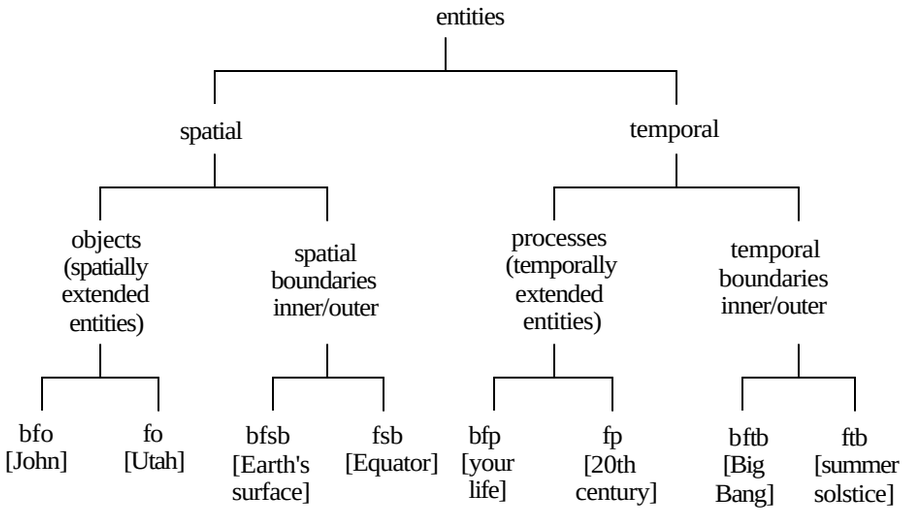

Figure 5. Taxonomy of Fiat and Bona Fide Entities (bf = bona fide, f = fiat, o = object, p = process, sb = spatial boundary, tb = temporal boundary)

The examples of fiat objects mentioned above are all cases where proper parts are delineated or carved out (by fiat) within the interiors of larger bona fide objects. They are examples of objects created by moving from the top (or middle) down. But

we can also proceed from the bottom up, by constructing higher-level fiat objects out of lower-level bona fide objects as parts. This is because, while we can assume that all bona fide objects of human scale are connected, fiat objects may be scattered; they may be such as to circumclude separate bona fide objects within larger fiat wholes. Polynesia is a geographical example of this sort; other examples might be: the Polish nobility, the constellation Orion, the species *cat*. (Smith 1999) Such higher-order fiat objects may themselves be unified together into further fiat objects (say: the Union of Pacific Island Nations). The fiat boundaries to which higher-order fiat objects owe their existence are the mereological sums of the (fiat and bona fide) outer boundaries of their respective lower-order constituents. Set theory is a general theory of the structures which arise when objects are conceived as being united together in this way on successively higher levels without restriction. The resultant cumulative hierarchy is of course of considerable mathematical interest. But it is a hierarchy which, when compared to the reality beyond, involves considerable redundancy at every level, and it is an open question whether there is any theoretical interest attached to such *ad libitum* unification from the perspective of ontology. For the concrete varieties of higher-order fiat objects which in fact confront us are subject always, in their construction, to quite subtle sorts of constraints.

3. Fiats Perceptual, Ecological, Geometrical and Political

To set out the constraints on the drawing of fiat boundaries is a task that is by no means trivial. For the moment, however, it is more important to consider what might be the justification for awarding the categories of fiat boundaries and fiat objects a crucial organizing role in our categorial scheme. Are geospatial entities truly of ontological importance? Can basic principles of metaphysics really turn on the rather elaborate beliefs and conventions that human beings have evolved in relation to place, space and politico-administrative jurisdiction? To see why these questions must be answered in the positive, consider what happens when two political entities (nations, counties, or even parcels of land) lie adjacent to one another. The entities in question are then said to share a common boundary. This sharing of a common boundary is, I want to claim, a peculiarity of the fiat world. To see this, it may suffice to imagine that two bodies, say Bill and Monica, should similarly converge upon each other for a greater or lesser interval of time, for example in shaking hands. Physically speaking, as we know, an account of what happens in the area of apparent contact of the two bodies has to do first of all with a compacting of molecules on either side, and ultimately with aggregates of sub-atomic particles whose location and whose belongingness to either one or other of the two bodies are only statisti-

cally specifiable. As far as the bona fide outer boundaries of Bill and Monica are concerned – and this for both physical and mathematical reasons – no genuine contact or coincidence of boundaries is possible at all. (This is the Monica Lewinski Theorem.[4]) Yet in comprehending the apparent contact between the two bodies as a *shaking of hands*, our healthy common sense grasps the corresponding portion of reality unproblematically in coarse-grained fashion as a case of genuine contact.

My suggestion, now, is that in order to understand what is involved when we relate cognitively to phenomena such as this, we need to distinguish structures at different levels of granularity on the side of the objects with which we have to deal. The atoms and molecules at finer resolutions are bona fide entities. The handshakes, kisses, nods and other similar entities on the coarse-grained level of granularity are creatures of the fiat world. This means that in grasping these phenomena as cases of genuine contact we conceive them as involving fiat boundaries which are analogous, as concerns their topological properties, to the fiat boundaries between, say, Virginia and Maryland.

Some might wish to go further, and argue that the denizens of what we might call *common-sense reality* are in every case entities whose existence is tied to the existence of a system of fiat boundaries in the suggested sense.[5] From this point of view it is worth bearing in mind that even in the geographical realm there are objects (deserts, valleys, dunes, etc.) reasonably classified as fiat objects which are delineated not by *sharp* outer boundaries but rather by boundary-like regions which are to some degree indeterminate. The principal motor for the drawing of fiat boundaries in commonsensical reality would then be human perception, which – as we know from our experience of Seurat paintings – has the function of articulating reality in terms of sharp boundaries even when such boundaries are not genuinely present in the autonomous physical world.

When visual perception operates in such a way as to give rise to fiat objects in our environment, then such objects belong to the so-called '-', defined by the psychologist Ewald Hering as the totality or region of real objects imaged at a given moment on the retina of the right or left eye. (1964, p. 226) The visible field is a part of the ambient environment of the visually perceiving subject. The external boundary of this field is now a fiat boundary in the terms set out above, a fiat boundary which changes with every movement of the eye and head. It is a boundary which exists only as a result of human cognitive activity, though it is of course dependent also on underlying physical and physiological conditions and processes on the part of both perceiver and environment. The interior of this field is itself subject to a complex and subtle fiat organization: it is built out of physical surfaces and other components which are structured in terms of an opposition between (1) entities in the focus of

attention and characteristically manifesting determinate boundaries ('figures'), and (2) entities which have indeterminate boundaries and which are experienced as running on (as 'ground') behind them.

The visual field is an instance of a wider class of fiat objects to which belong also niches, environments, settings and other objects of ecological metaphysics. (Smith and Varzi 2000) The theory of such objects is related in turn to the 'geometry of surface layout' conceived by J. J. Gibson in the section entitled "Surface and the ecological laws of surfaces" of his (1979). As Gibson writes:

> According to classical physics, the universe consists of bodies in space. We are tempted to assume, therefore, that we live in a physical world consisting of bodies in space and that what we perceive consists of objects in space. But this is very dubious. The terrestrial environment is better described in terms of a medium, substances, and the surfaces that separate them. (1979, p. 16)

Gibson seeks 'a theory of surface layout, a sort of applied geometry that is appropriate for the study of perception and behavior' and which would investigate concepts such as: ground, open environment, enclosure, detached object, attached object, hollow object, place, sheet, fissure, stick, fiber, dihedral, etc. (1979, p. 33) Such a theory would have to deal not merely with bona fide boundaries (created, for example, when a door is closed), but also with fiat boundaries (created when a door is open, or by the light casting a shadow across a part of your cave). It must deal also with what we might call negative objects, above all with holes (Casati and Varzi 1994), many of which, again, are fiat objects since they are not bounded on all sides in bona fide fashion by their supporting hosts. A tunnel, for example, is bounded physically by its walls, floor and roof; at its entrance and its exit however it must make do with fiat boundaries. There is a tunnel which passes from the oesophagus through the stomach and on to the small and large intestines. These various parts of the tunnel are separated in virtue of bona fide boundaries founded in the different microscopic structures of the different portions of the tunnel. The boundaries within the tunnel itself however are fiat in nature. Note that not all holes are to be counted as fiat objects in this sense; for there are cavities in the interiors of otherwise solid objects which have complete boundaries of a bona fide sort.

Fiat boundaries are required, further, not only as a part of the foundations of qualitative geometry, but also as part of an account of what is involved when we reason geometrically in a more traditional sense. Certainly we may use lines in the sand, or on the blackboard, as props. But the theorems we prove relate not to bona fide aggregates of sand or chalk, but rather to the idealized figures which such aggregates represent, and these belong to the realm of fiat entities: they are made up, for exam-

ple, of fiat points, lines and surfaces. Given the prominent role played by political entities in the present theory, it is interesting to recall the interplay of geometry and politics in the philosophy of Hobbes. The subject-matter of philosophy begins from the Hobbesian perspective with the geometry of single bodies and it extends from there to complex commonwealths. Bodies thus come in two varieties: the *natural* and the *political*. Geometry deals with natural bodies, politics with the body politic. Geometry is demonstrable because the lines and figures from which we reason are drawn and described by ourselves; civil philosophy is demonstrable (Hobbes thinks), because *we make the commonwealth ourselves*. (Bird 1996)

4. Linguistic Fiats

Perhaps the most conspicuous examples of fiat objects are those which arise in virtue of the groupings and refinings of reality which are involved in our use and understanding of natural language. Such grouping and refining occurs in a two-fold process. On the one hand, linguistic entities such as spoken words and sentences are themselves processes demarcated in fiat fashion out of concrete sound-material that is in itself not cleanly separated into tidy linguistic units via discontinuities in the flow of sound of a bona fide sort. On the other hand external reality, too, is in a certain sense tailored to fit our linguistically generated expectations. We apprehend the world as consisting of pairs of shoes, bundles of string, fleets of ships, of bombings, butterings and burnishings, and in each case fiat boundaries are at work in articulating the reality with which we have to deal. Thus if I say 'John built mud pies in the sand', then the real-world correlate of the object of this sentence is a complex plurality (fiat object) whose constituent unitary parts are comprehended through the concept *mud pie*. If I say 'John embarrassed Mary', then the real-world correlate of the verb of this sentence is a complex dynamic affair (a fiat process) which is comprehended through the transitive verb *embarrass*.

The way in which natural language contributes to the generation of fiat boundaries may be illustrated in relation to the correlated linguistic phenomena of (1) the *mass–count* opposition and (2) *verbal aspect*. (Mourelatos 1981) As to (1), the hungry carnivore points towards the cattlefield and pronounces 'there is cow over there'. How does his pronouncement differ, in its object, from 'there are cows over there'? Not, certainly, in the underlying real bovine material. Rather in virtue of the different sorts of boundaries which are imposed upon this material in the two cases. As to (2), verbal aspect has to do with the 'internal temporal constituency' of the events towards which our empirical judgments are directed. (Comrie 1976) Consider that concrete factual material which is John kissing Mary on a given occasion.

This consists, we might crudely suppose, of three objects: John, Mary and a certain complex of temporally extended processes. In the extended totality of this factual material, fiat boundaries can come to be drawn in a variety of different ways. Thus the given factual material can be comprehended as: 'John is kissing Mary', 'John is repeatedly kissing Mary', 'Mary is constantly being kissed by John', and so on.

A veritable host of transient fiat boundaries comes to be drawn in reality through our use of language. Such carving out of linguistic fiat objects is in part a matter of sheer grouping together, for example of the sort that is achieved through the use of plural referring expressions such as 'Hannah and her sisters' or 'Siouxsie and the Banshees' (see Ojeda 1993). But it is in part also a matter of windowing or foregrounding (Talmy 1996) and in part a matter of the articulation of external reality in terms dictated by our concepts in the manner indicated above. If I point to a group of irregularly shaped protuberances in the sand and say 'dunes', then the objectual correlate of my expression is a complex plurality (a higher-order fiat object with non-crisp boundaries) divided, via the concept dune, into constituent (non-crisp) parts or elements. (Smith 1987, § 15) Cognitive linguists such as Talmy, Langacker and Lakoff have rightly emphasized the degree to which language effects complex and subtle concept-mediated articulations of this sort.

One important class of transient fiat boundaries is effected through our use of natural language expressions such as 'this' and 'that' in relation to objects in space. This involves in each case the drawing of an imaginary boundary, lying in the region in front of and parallel to the speaker, which is such that the objects labeled 'this' and 'that' lie on opposing sides of the boundary, in roughly the following fashion:

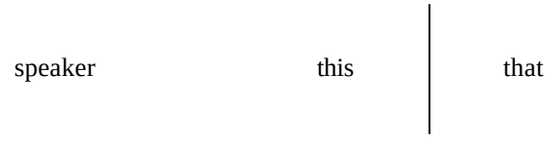

Figure 6: Ephemeral Fiat Boundary Established by Use of Indexical Terms

The use of 'here', similarly, involves the creation of an ephemeral fiat boundary comprehending a roughly spherical volume of space around the speaker, a volume whose size, shape and location, and perhaps also degree of crispness (Smith and Brogaard 2001) are contextually determined.

It is an interesting feature of this type of transient boundary-creation that it is effected in exactly the same way independently of order of magnitude, from the tiniest ('this flea') to the grossest ('that empire,' 'yonder galaxy'). And as Talmy has also shown (1995), boundaries of the given sort belong to a much larger family which

includes also the fictive orientation paths which are created when we assert, for example:

I aimed the camera into the living room.

(think of an invisible arrow – a fiat line – extending out from the camera into the room). Such orientation paths may further be dynamic in nature:

I slowly looked towards the door.
I slowly turned the camera around the room.

Fiat boundaries are at work also in cases of the following sort:

I offered her the book [creates a virtual sphere around the recipient, Agnes].
She accepted the book [Agnes allows the sphere to be broken].
She rejected the book [Agnes maintains the sphere unbroken].

Unfortunately, however, having convincingly shown how a theory rich enough to give an account of the semantics of such expressions must involve the recognition of non-physical paths and boundaries of a range of different sorts, Talmy subverts his own theory by placing the entities in question not, where they belong, out there in the world around Agnes, but rather *in the mind of the speaker*. The inadequacy of such a view becomes clear if we reflect on the fact that a sentence involving expressions of the given sorts might be either true or false. Whatever exists in the mind of the speaker will in either case be identical – and thus something extra is required in the case of true sentences, something which must exist out there, on the side of the truthmakers in reality.

Along with other cognitive linguists, Talmy also makes an illegitimate move from the thesis that such fiat boundary phenomena are pervasive features of our various modes of gaining linguistic access to the objects in our everyday world, to the conclusion that the world to which we then have access is a world of fiats only. On the contrary, the very existence of fiat boundaries, here as elsewhere, presupposes a bona fida reality consisting of objects at various scales in and through which such boundaries can be drawn. A thesis to the effect that language gives us access only to objects which we ourselves create through our linguistic fiats would moreover imply the impossibility of all scientific investigation of a theory-independent world (including the scientific investigation of the neurobiological and physiological underpinnings of language itself) and would thus saw off the very hand that feeds it. The cognitive lin-

guists embrace, in sum, a position that is reminiscent of the fable of King Midas, in which all the objects to which language refers are fiat objects because the very act of linguistic reference makes them lose their bona fide status (they become 'clothed' in our linguistically expressed concepts). [6] They move, in other words, from: 'all objects which we grasp linguistically are grasped through our linguistically expressed concepts' to 'all objects which we grasp linguistically exist only in virtue of our linguistically expressed concepts'.[7] The argument is invalid, because it presupposes from the start what it is attempting to prove, namely that all of our concepts fail to be transparent to objects as they are on the side of reality.

Everyday objects and processes are described by cognitive linguists such as Talmy and Lakoff as existing in the 'conceptual realm'. Even space itself is often described by Talmy as a mere 'conceptual domain' in a way that implies that, in the absence of concept-using subjects like ourselves, space would not exist. If, as I have suggested, the fiat boundaries induced through natural language are of a piece with geographical fiat boundaries, then it is clear how Talmy's position is to be corrected: the fiat boundaries to which reference is constantly made in our natural language utterances are not in any sense in our heads, or in some spurious conceptual sphere. Rather, they are out there in the world. They are not, however, physical in nature. Rather, they are analogous to other ephemeral socio-cultural formations – such as debts, claims, responsibilities – entities which are parts of what Frege would call 'objective' reality, yet not such as to fall within the domain of physical science. (Smith and Searle 2001)

And now, if some fiat boundaries – like the borders of nations or postal districts – are social entities, analogous to rights, claims and obligations – then they will be subject, like these, to legal regulations. When the legal system takes up into its orbit a vaguely bounded region (a wetland, say), then it characteristically adds a rule that is designed to make its boundary precise. Private property in some jurisdictions extends to the mean low water mark, and for any coastal portion of the United States or Canada there is some legal definition based on mean low, high, average, etc. tide level, as to where private property stops and a commons starts. Definitions are needed also as to how such determinations apply when boundaries cross the mouths of rivers. If the legal system needs to know where the shoreline is in order to regulate access, then it will need to pick some particular stage in the tidal cycle, such as mean low tide level; it thus creates a fiat shoreline that is fixed and reasonably crisp, and this exists as it were alongside the bona fide shoreline that moves with the tides. You cannot see or touch or trip over the fiat shoreline; but the fiat shoreline is there, nonetheless, as a part of reality: if you cross it, you will be fined.

5. Tibbles' Tail

The notion of fiat object can be exploited also to resolve a number of puzzles in philosophy. Consider your cat Tibbles, an enduring, three-dimensional entity (a continuant, or substance, a living organism). At a certain point in time Tibbles loses her tail, which becomes an enduring, three-dimensional entity in its own right (a lump of dead matter). We write 'Tibbles$_1$' for Tibbles before the loss of her tail, and 'Tail$_1$' for the tail as it exists before detachment. Similarly we write 'Tibbles$_2$' and 'Tail$_2$' for Tibbles and her tail, respectively, as they exist after detachment. A familiar dilemma[8] can now be constructed, as follows:

1. *Tail$_1$ is a part of Tibbles$_1$*
2. *Tail$_2$ is not a part of Tibbles$_2$*
3. *Tibbles$_1$ = Tibbles$_2$*
4. *Tail$_1$ = Tail$_2$*

1. and 2. result from simple inspection. 3. and 4. are applications of the transitivity of identity over time for enduring three-dimensional entities.

One might suppose that a simple solution to this problem can be gained by means of a careful reading of the tenses involved in our four assertions. Tail (then named 'Tail$_1$') was once a part of Tibbles (then named 'Tibbles$_1$'), but now (under the name 'Tail$_2$') exists in separation from its former host (now living under the name 'Tibbles$_2$'). But consider Tib$_1$, the result of subtracting Tail$_1$ from Tibbles$_1$. Tib$_1$ was once a proper part of and thus not identical to Tibbles$_1$, but is later (under the name 'Tib$_2$') identical to Tibbles$_2$. There is no tensed reading of 1.–4. which will make it compatible with this proposition.

Currently fashionable resolutions of the dilemma involve a denial of both 3. and 4. This denial is rooted in a radical rejection of all three-dimensional enduring entities in favor of an ontology of four-dimensionalist (spatiotemporal) wholes. With the machinery of fiat objects at our disposal, however, we can propose a new sort of solution, a solution that is both more conservative and also more intuitively appealing. This consists in holding on to 3. (and thus to the possibility of transtemporal identity for three-dimensional entities like you and me), while rejecting 4.

The argument against 4. turns on the recognition that Tail$_1$ – in contrast to the other entities referred to in propositions 1.–4. – is not a substance. This follows from a subsidiary hypothesis:

5. *Every substance has its own complete bona fide exterior boundary,*

A substance is a topologically maximal entity. (Smith 1992) To refute 5. it would

suffice to find examples of substances which lack complete external bona fide boundaries. Siamese twins as they exist before separation will not serve this purpose, since they are from a metaphysical point of view most adequately conceived as forming one substance separated into two human beings by a fiat boundary along the plane where they meet. An embryo, on the other hand, as it exists within the interior of the mother, appears to be most adequately conceived as a substance in its own right. For there is no stage after ovulation where the embryo (and what will later be the fetus) is connected to the mother in such a way that they would then share a common boundary. Such a connection is not even established in the form of a canal or tube through which blood or nutrients might flow. The communication taking place between embryo or fetus and mother involves many separate processes of cell diffusion, but these processes occur always via some intervening liquid-filled cavity; they never involve the presence of that sort of common membrane which would be required for strict connection.

We can thus conclude that $Tail_1$ is, in our present terminology, a fiat object. It is comparable, in this respect, to the Texas Panhandle or to the Hibernian Peninsula. It exists only in a state of boundary-dependence upon the substantial host (Tibbles) within which it is included as part.[9] Hypothesis 5. implies that a fiat object of this sort can never be identical with any bona fide object, and thus our dilemma is resolved.

6. Truthmakers as Fiat Objects

The notion of fiat entity can be exploited also in order to throw light on a long-standing dispute in philosophical discussions of the concept of truth. Truth has classically been understood in terms of a *correspondence* between a judgment or assertion on the one hand and a certain portion of reality on the other. A problem arises in virtue of the fact that reality does not come ready-parceled into judgment-shaped portions of the sort that are predisposed to stand in relations of correspondence of the given sort. The practitioners of logical semantics have thus tended to treat, not of truth as such (truth to reality), but rather of truth *in a model*, where the model is a specially constructed set-theoretic reality-surrogate. The theory of fiat boundaries can help us to avoid the need for this resort to surrogates by allowing us to treat judgment itself as a *sui generis* variety of drawing fiat boundaries. True judgments effect a drawing of boundaries which is successful in the sense that it does not conflict with reality. The resultant boundaries themselves are drawn, as before, in the extended world of genuine objects and associated processes. The fiat entities they circumscribe are typically many-sorted: they include both objects and processes (as sentences standardly include both nouns and verbs). Such entities are on the one

hand autonomous: that region of reality through which the given boundary is drawn—for example the complex of objects and processes which are involved in John's kissing Mary—exists in and of itself, regardless of our judging activity, and so do all its constituent sub-regions. The whole itself is however also in a certain sense dependent on our judgment. For in the absence of the judging activity through which the drawing of the fiat boundary is effected, an entity of the given sort would in no way be demarcated from its surroundings. Judgment-shaped parcels of reality can in this way be said to exist in autonomous reality, and to be precisely tailored to make our judgments true, yet the recognition of such entities is still consistent with that healthy respect for Ockham's razor which is the mark of all scrupulous ontology.

There is, as already noted, a certain windowing of reality that is effected by our uses of language, especially of those descriptive uses of language which are involved in the making of true empirical judgments. The ephemeral fiat boundaries effected through declarative sentences can now be seen to be analogous to the ephemeral boundaries of the visual fields, which we have already seen to be associated with our acts of visual perception. Veridical judgments then stand to their fiat judgment-correlates as acts of veridical perception stand to their associated visual fields.

Each true empirical judgment can be seen as effecting a division of reality in fiat fashion in such a way as to mark out a certain truthmaking region consisting of those entities that are relevant to the truth of the judgment in question. Truth itself can then be defined as the relation of correspondence between a judgment and its corresponding truthmaking region, in such a way that a true judgment would be something like a map of the corresponding portion of reality.[10] A view of truth along these lines – for all its superficial strangeness – can be seen on inspection to enjoy a degree of phenomenological, linguistic and ontological adequacy that is higher than alternative accounts. Its phenomenological adequacy derives from the fact that the account of windowing of reality via language is of a piece with an account of perceptual windowing, so that a theory of evidence, of verification and falsification in perceptual acts is available from the start. Its linguistic adequacy derives from the fact that the view imposes no unitary logical form (for example the subject-predicate form, or the form of functional application) upon our judgments. Rather it is sensitive to the wide range of different natural-language sentence forms which are utilized in making true judgments, forms whose corresponding demarcatory effects have been described in detail in the work of the cognitive linguists (see especially Langacker 1987/1991). Its ontological adequacy derives, finally, from the fact that the view is able to do justice to the untidy, flesh-and-blood character of the reality to which our judgments are directed, and thus does not rely on convenient set-theoretical substitutes.

7. Fiat Concepts

An analogue of the fiat–bona fide opposition can be applied also in the realm of concepts. Imagine the instances of a concept arranged in a quasi-spatial way, as happens for example in familiar accounts of color- or tone-space. (Gärdenfors 2000) Suppose that each concept is associated with some extended region in which its actual and possible instances are contained, and suppose further that this is done in such a fashion that the prototypes, the most typical instances, are located in the center of the relevant region and the less typical instances are located at distances from this center in proportion to their degree of non-typicality. Boundary or fringe cases can now be defined as those cases which are so untypical that even the slightest further deviation from the norm would imply that they are no longer instances of the given concept at all.

In this fashion counterparts of the familiar topological notions of boundary, interior, contact, separation, and continuity can be defined for the conceptual realm, and the notion of similarity as a relation between instances can be understood as a topological notion (Mostowski 1983). In the realm of colors, for example, *a* is similar to *b* might be taken to mean that the colors of *a* and *b* lie so close together in color-space that they cannot be discriminated with the naked eye. A similarity relation is in general symmetric and reflexive, but it falls short of transitivity, and is thus not an equivalence relation. This means that it partitions the space of instances not into tidily disjoint and exhaustive equivalence classes, but rather into loosely demarcated circles of similars, which may overlap.

This falling short of the discreteness and exhaustiveness of partitions of the type which are generated by equivalence relations is characteristic of topological structures. In some cases *clusters* are formed: circles of similars separated by gaps (by regions of concept-space which comprehend no instances). This is so in regard to the transition from, say, lake to reservoir or from virus to bacteria. The corresponding concepts are then separated by the conceptual equivalent of bona fide boundaries. In other cases, however, there is a continuous transition from one concept to its neighbors in concept-space, as for example in the transition from red to orange, or from peninsula to promontory, or from lake to marsh to wetland. Wherever we have such a continuum of fine gradations along the path between one concept and its neighbor, there arises the analogue of fiat boundaries within the realm of concepts, which means also that there is a certain degree of human-controlled arbitrariness in determining where the boundary is to be drawn. Terms like ‘strait’ and ‘river’, for example, represent fiat partitions of the corresponding spaces of concepts. 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 *détroit* and *fleuve*. For while the Straits of Gibraltar are certainly not a river, and the Mississippi River is certainly not a strait, things like the Detroit River, the Saint Claire River, the Dardanelles, the Bosphorus are borderline cases. All are flat, narrow passages that ships can sail through between two larger waterbodies (lakes, seas), and all have net flow through them due to runoff. Is Lake Erie really a lake, or just a wide, deep part of the river-with-five-names that is called the St. Lawrence as it flows into the sea? Well, that depends on what you mean by 'lake'.

Quine has put forward a radical proposal according to which even the classical conceptual distinctions drawn in metaphysics are distinctions of this fiat sort. Consider three scattered portion of the world made up of rabbits, of rabbit stages, and of undetached rabbit parts, respectively. All three are, as Quine sees it, just the same scattered portion of the world. The only difference 'is in how you slice it.' (1969, p. 32). What he means is that the conceptual divisions between continuants, stages and undetached parts are in our terms mere products of fiat. Since reference is behaviorally inscrutable as concerns such distinctions, Quine concludes that there is no fact of the matter which they might reflect—no fact of the matter on the side of the objects themselves as these exist before we address them in our language.

Notice that this is not an epistemological thesis. Quine must hold that even an omniscient being would be in the same predicament as you or me as concerns referential inscrutability. Continuants, parts and stages do not differ from each other in virtue of any corresponding (bona fide) differences on the side of the corresponding entities in reality. Rather they differ from each other in the way in which, when asked to count the number of objects in the fruit bowl, you can say either: one orange, or: two orange-halves, or: four orange-quarters, and so on – and you will give the right answer in each case. The distinctions in question are merely the products of our fiat partitions of one and the same reality.

But note that Quine is being too hasty when he affirms in defense of his thesis of 'ontological relativity' that there is *no* ontological fact of the matter as concerns the reality to which we are related when using singular referring terms. For it follows from his own doctrine that it is a fact of the matter, for example, that this reality is intrinsically undifferentiated as far as the mentioned ontological distinctions are concerned. This is just the other side of the coin from the fact that the corresponding boundaries are entirely fiat in nature. This ontological fact of the matter, however, is itself a presupposition of the thesis of ontological relativity to the effect that there are no ontological facts of the matter.

Quine compounds confusion still further in coming close to a view according to which *all* boundaries on the side of objects in reality are of the fiat sort. Objects of

reference, for him, can comprise any content of some portion of spacetime, however heterogeneous, disconnected and gerrymandered this may be. For us here in contrast there are some ways of referring to things and processes which track bona fide boundaries in reality and others which do not. It is the job of fundamental science to move us in the direction of such bona fide joints of reality, though even when science has completed this job there will of course still be room for delineations of the lesser sort, which track boundaries – for example the boundary of Quebec, of Tibbles' tale, or of the No Smoking Section of your favorite restaurant – which exist only as a result of our acts of fiat.

8. Jeffersonian Fiats

Consider again the sort of delineation exemplified by Jefferson's 1784 creative act. Delineations such as these are effective in creating objects in the geospatial realm only if the pertinent boundaries are, in the jargon of topology, Jordan curves (broadly: the boundary of a geopolitical or administrative entity must be free of gaps and must nowhere intersect itself). Note, again, the top (or middle) down effect of such object creation. There are no (or no obvious) candidate 'atoms' or 'elements' in the geographical world from out of which geospatial fiat objects could be seen as being constructed in analogy with the way in which sets are constructed out of their members. Hence the need, in a formal ontology of geospatial objects, for a topology that is constructed on a mereological basis, rather than on the standard set-theoretical basis.[11]

Geographers deal with fields or regions of different shapes, sizes and functions, with sub-fields of these regions, and with the ways these fields and sub-fields overlap or fail to overlap. (Casati and Varzi 1999) They deal, in other words, with a mereologically structured world. Some of Jefferson's delineations correspond to bona fide boundaries: river-banks, coastlines, and the like. These are boundaries in the things themselves, and they would exist (and did indeed already exist) even in the absence of all delineating or conceptualizing activity on our or Jefferson's part. Almost all the borders of political and administrative units in the North-American continent are however delineations which correspond to no genuine heterogeneity on the side of the bounded entities themselves.

We must bear in mind, of course, that many national and property boundaries do in course of time come to involve boundary-markers: border-posts, watch-towers, barbed-wire-fences, and the like, which will tend in cumulation to replace what is initially a fiat boundary with something more real (tangible, physical). Fiat and bona fide objects are interrelated also epistemologically. Thus in cadastral practice

certain objects, for example surveyors' pegs placed to establish a boundary, enjoy a privileged status in determining at later times where the boundary lies. This means that there are laws governing the use of such objects, as also of posts, walls, fences and so forth, as evidence of boundary location, laws for example having the effect of limiting the degree to which walls may be moved when rebuilt. Such laws institute a new layer of fiat boundaries, attached to the primary layer and constituting surrounding zones of tolerance.

There are, here and elsewhere, reasons of a non-arbitrary sort why these and those fiat objects are created rather than others. Thus it seems to have been a complex medley of considerations relating to shipping, trade, harbors, climate, markets, and so on, which led our ancestors to create the fiat object "North Sea" in a way which could not, just as well, have motivated them to create, say, a "Middle Sea" stretching between the Bermudas, the Azores, and Gotland. Fiat objects in general owe their existence not merely to human fiat but also to associated real properties of the relevant factual material (they are functions of affordances, in J. J. Gibson's terms). As demarcated in mesoscopic (geographical) reality they are in every case linked to bona fide objects at various scales without which the relevant demarcations could not be effected at all. It is already for this reason a confusion to suppose that all objects (or all mesoscopic objects) might be of the fiat type. As the reports of boundary commissions make abundantly clear, the very possibility of fiat demarcation presupposes the existence of bona fide landmarks in relation to which fiat boundaries can be initially specified and subsequently re-located. The admission of fiat objects into our ontology is then at least in one respect unproblematic: all fiat objects are supervenient on bona fide objects on lower levels, in the sense that the fixation of relevant traits at the lower levels suffices to fix the values of traits at higher levels. The interiors of fiat objects are in this sense autonomous portions of autonomous reality. Only the respective external boundaries are created by us; it is these which are the products of our mental and linguistic activity, and of associated conventional laws, norms and habits. The relevant underlying factual material is in every case unaffected thereby.

The most conspicuous examples of fiat borders in the geopolitical sphere are the borders drawn up by colonial administrators in London, Washington or Ottawa, with hardly any knowledge of what was on the ground or of the people who lived there. History has shown that such fiat boundaries can be stable and peaceful, and even in Africa conflicts have almost always arisen for reasons quite independent of the boundaries imposed by colonial administrators long ago. Contrast this with the carefully drawn boundaries in eastern Europe, which were based on the idea of a 'self-determination of nations'. (Smith 1997a)

The Mason-Dixon line is one example of a boundary drawn in a distant capital without regard for, or even knowledge of, the physical or cultural landscape. There are many pieces of state borders in the USA that pay no regard to underlying physical features. Part of the Delaware-Pennsylvania border is even an arc of a circle.

It is interesting in this respect to consider the question when an imaginary mathematical line (a fiat boundary) was first recognized as a political limit separating two territories. In his *The Renaissance Rebirth of Linear Perspective* (1975, p. 115), Edgerton describes how, during the wars of 1420, a longitudinal line was proposed as the boundary between the two states of Milan and Florence. The reference is to the treaty between Filippo Maria and Florence dated February 8, 1420, which designated the ideal line connecting Magra and Panaro as the limit of their respective spheres of influence (which themselves referred back to another treaty, from 1353, where Milan and Florence each agreed to stay out of the affairs of Tuscany and Lombardy). It is however very unlikely that this line was a true boundary between the two territories. Thus the question as to the first genuine geopolitical fiat boundary remains unresolved.

9. Vagueness, Gaps and Gluts

As already pointed out, geographical fiat objects will in general have boundaries which involve a combination of bona fide and fiat elements. The shores of the North Sea are bona fide boundaries, but we conceive the North Sea as a fiat object nonetheless, because where it abuts the Atlantic it has a boundary of a non-bona fide sort. The status of the latter boundary is noteworthy in that there seem to be few practical consequences which turn on the issue as to where, precisely, it lies. Political boundaries were once themselves standardly created in places (mountain ridges, middles of rivers) where there is little human activity and thus little chance or occasion to look into their exact location.

The case is similar in regard to many geographical boundaries of what we might call the purely qualitative sort (as contrasted with legal, political and administrative boundaries): consider, for example, the boundary between a hill and an associated valley. As such examples make clear, it is necessary to draw a further opposition between what we might call crisp and indeterminate boundaries.

Many objects – deserts, valleys, mountains, noses, tails – are delineated not by crisp outer boundaries but rather (on some sides at least) by boundary-like regions which are to some degree indeterminate. This is not to say that the ontology that is needed in order to cope with such objects must countenance a reality that is ultimately vague. Certainly there are some who have argued for a fundamental cate-

gorial scheme that would allow for both crisp and scruffy (fuzzy, hazy, indeterminate) entities as part of the furniture of the universe. Here, however, vagueness will be seen as matter of semantics. We have seen part of what is involved in such a view already above. If you point to an irregularly shaped protuberance in the sand and say 'dune', then the correlate of your expression is a fiat object whose constituent unitary parts are comprehended through your concept dune. The vagueness of the concept itself is responsible for the vagueness with which the referent of your expression is picked out. And what this means is that each one of a large variety of slightly different and precisely determinate portions of reality has an equal claim to being such a referent.

The above corresponds to the so-called supervaluationist account of vagueness (Fine 1975, McGee 1997, Varzi 2001). As is argued in Smith and Brogaard (2001), the supervaluationist view can be sustained only if account is taken of the fact that the assignment of a range of candidate precisified referents to a given expression is dependent on the context in which that expression is used. This is because the degree of vagueness we can comfortably allow in our delineations varies inversely with the degree to which a given boundary is of practical relevance – and what is and is not of practical relevance is of course such as to vary from one context to another. When you have a map, and it has a shoreline with ins and outs, and on the water adjacent to one of the ins is a label saying 'Baie d'Ecaigrain', it is fairly easy for a human to see where the bay is. The outer boundary of the bay (seaward) is in most contexts irrelevant to action or practice, and thus a wide range of precisifications is allowed. In a context in which regulators have ceded all the islands (or oil) in the bay to some other country, however, a quite different and much narrower range will be required. Human beings can cope quite well with such vagueness of reference and with contextually determined reference shifts. Computers, on the other hand, have trouble processing information to the effect that the bay is here, and that it extends from there to there on the coastline, but then just fades off to seaward.

Mountains, hills, ridges, capes, points, necks, brows, shoulders, heads, knees, shanks, rumps, pockets, fronts, backs, pits – we can all agree that these are real, and that it is obvious for example where the top of a mountain or the end of a cape is to be found. The crisply determined features of such entities – for example the heights of mountains – can be looked up in reference books. But where is the boundary of Cape Flattery on the inland side? Where is the boundary of Mont Blanc on the French and Italian sides?

Most modern geopolitical boundaries are distinguished in being infinitely thin (crisp, determinate, precise). Political and legal boundaries must, it seems, enjoy at least idealiter and in the long run a geometrical perfection of this sort, which is to say

that they must take up no space. For otherwise disputes would constantly threaten to arise in relation to the no-man's-lands which the boundaries themselves would then occupy. If a wall or river separates two distinct portions of land, then either the wall or the river must be split equally down the middle, or it must be assigned as a whole to one or other of the two parties, or it must be declared common property (and then there will exist two infinitely thin boundaries separating each of the two distinct parcels of land from the commonly owned region which divides them).

Each adjacent pair of geopolitical boundaries (say: on the Franco-German border) manifests in addition the phenomenon of coincidence of boundaries. The boundary of France is not also a boundary of Germany: each points inwards towards its own respective territory. Contrast, in this respect, the Western boundary of the old German Democratic Republic or the southern border of the present Turkish Republic of Northern Cyprus: here, exceptionally, no coincident twin was established, since the relevant neighbors did not see fit to institute a boundary of their own.[12] Moreover, as the case of Texas and the U.S.A. makes clear, distinct geopolitical boundaries may also coincide from within. That is, they may coincide for a part of their length along which they serve as boundaries on the same side.

The peculiar plasticity of the fiat real brings it about that there are, moreover, departures from ideal crispness in the realm of geospatial boundaries of a sort not to be catalogued under the heading of vagueness. There are both gaps and gluts. Gaps are relatively simple to come to terms with: they correspond to no man's lands, to regions which have not yet been assigned to one jurisdiction or another. Gluts are a more intriguing matter. Consider the border between Germany and Luxemburg. Where borders between states usually run down the middle of water bodies, the bed and banks of the rivers Mosel, Sauer and Our belong to *both* Germany and Luxemburg, which hold them in a condominium, a status which has been shared by all the water bodies forming the boundary between these two countries ever since 1816, the year of the first written agreement on the boundary separating the United Netherlands from Prussia.

An ontological status that is still more problematic is enjoyed by Lake Constance, which forms part of the boundary between Austria, Germany and Switzerland. Lake Constance is an ontological black hole in the heart of Europe, whose territorial status is in seemingly unresolvable limbo. While one part of the lake, Lake Überlingen, belongs completely to Germany, the course of the border in the rest of Lake Constance has not been laid down. For while Switzerland holds the view that the border runs through the middle of the Lake, Austria and Germany are of the opinion (albeit on different grounds) that the lake stands in condominium of all the states on its banks. Hence no international treaty establishes where the borders

of Switzerland, Germany, and Austria in or around Lake Constance lie. If you buy a ticket to cross the Lake in a Swiss railway station, your ticket will be valid only to the point in the middle of the Lake where, as the Swiss see it, their jurisdiction ends.

10. Scattered Fiat Objects

The drawing of fiat boundaries, as we saw, can create – Montana-style – fiat parts within larger bona fide wholes. But it can also – Hawaii-style – create fiat wholes out of smaller bona fide parts. And then, while bona fide objects are in general connected, the fiat objects which are circumcluded by fiat boundaries in this way are scattered entities.

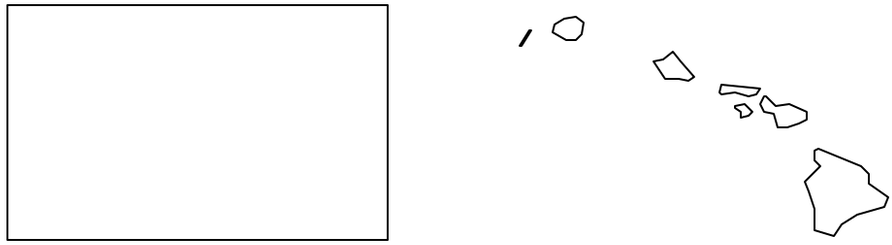

Figure 7: A Map of Montana (left)[13] and a map of Hawaii (right).

There are also cases where the two distinguished factors – on the one hand the carving out of fiat parts, and on the other hand the gluing together of fiat wholes – operate in tandem, so that geographical objects are created via the fiat unification of disconnected parts within larger bona fide wholes: the Holy Roman Empire of German Nations (which means: of some hundreds of themselves sometimes non-connected principalities, bishoprics, city-states, etc.) will serve as a nice example in this regard, but so will all coastal nations in whose territory islands are included.

Pairs of scattered fiat objects may be intercalated inside each other in more or less complex ways. Consider the case of the Belgian enclave of Baarle-Hertog, which is depicted, together with its neighbor, the Dutch community of Baarle-Nassau, in Figure 8.

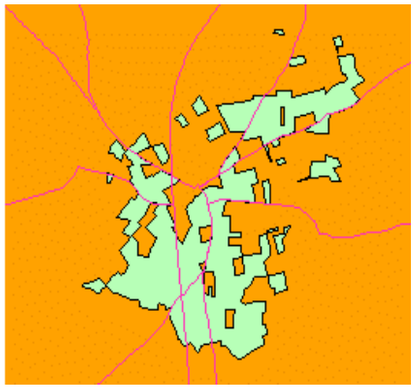

Figure 8: The Enclaves of Baarle-Hertog and Baarle-Nassau

This represents an area of roughly three square kilometers situated some 5 km. from the Dutch-Belgian border near Turnhout. The lighter shaded areas here represent the community of Baarle-Hertog. The small darker shaded areas depict the tiny Dutch enclaves of Baarle-Nassau. Each such enclave is surrounded by a portion of Belgian territory, which is in its turn surrounded once more by territory that is Dutch. This peculiar arrangement arose as a consequence of Dutch independence from Spain in 1648, when the Dutch border was defined on the basis of a long-standing feudal provincial boundary, which in turn featured numerous enclaves and exclaves. A strong religious divide between the Netherlands and Spain in 1648, coupled with rural conservatism favoring the status quo, together stymied all governmental attempts to exchange or cede the enclaved lands. The two families of enclaves around Baarle were briefly merged in 1815 with the formation of the United Netherlands at the Congress of Vienna. But with the independence of Belgium in 1830, the old situation was resurrected, and once again ancient provincial limits were used as the international border. Being unable to determine a more rational boundary, the 1843 Treaty of Maastricht was forced to resort to the individual determination of national ownership of each of 5732 plots in the two communes, yielding a delineation of the border that survived until 1995, when modern administration, infrastructure and legal systems necessitated an exacting survey, which has cemented the existence of the enclaves in the arrangement depicted above.[14]

11. Problems with the Theory of Fiat Objects

Bays, peninsulas, valleys, promontories are parts of spatial reality, physical parts of the world itself. The introduction of the notion of fiat object rests on the idea that

they are parts of reality which would not be there absent corresponding linguistic and cultural practices. This was hypothesized in Smith and Mark (1999), who postulated also that such objects are thus likely to be objects of categorizations which enjoy a high degree of cross-cultural variance. It must however be admitted that there are reasons for resisting the assumption that all such entities belong in equal degree to the fiat realm. Consider for example bays. These constitute affordances not only for fishermen and oyster-catchers, but also for fish and oysters, and the latter have no bay-related linguistic and cultural habits upon which the bays themselves could be seen as being ontologically dependent. Just as there is island biogeography, which studies special features of islands from the point of view of species evolution, so we can imagine disciplines of bay, peninsular, mountain and valley biogeography, which would do something similar for bays, peninsulars, mountains and valleys. If such disciplines are indeed conceivable, then it is conceivable also that entities of the given sorts would not be fiat entities after all. On the other hand we can equally call into question the degree to which our prime examples of bona fide objects are in fact completely free of the taint of human dependence. Where, for example, is the outer border of a tennis ball, or of the planet Earth, or of David Lewis? Where is the border of the Earth's atmosphere? Did this border exist even before human beings came along with their sophisticated theories and measuring devices? Might physicists be called upon to determine by ballot where the outer boundary of the sun shall officially lie? What counts as a 'qualitative differentiation or discontinuity' on the surface of the Earth? What constitutes a 'discontinuity' in physical reality? Such differentiations or discontinuities may be abrupt (in the case of a vertical cliff) or more gradual (in the case of a sloping incline), and their gradualness may extend over millimeters or light years. Geographic features, along with other features of reality that we encounter at human and non-human scales, have parts at both macro and micro levels of granularity, and when we pay careful attention to the latter then the idea that there are abrupt physical discontinuities begins itself to seem questionable (as though what is a discontinuity were itself a fiat matter).

Must we then conclude that the fiat–bona fide opposition needs to be abandoned? Again, I think not. For there are still too many clear examples of fiat and bona fide objects *at given levels of granularity* both inside and outside geography for the dichotomy itself to be dismissed as spurious. Mesoscopic physical objects (people, walls, items of furniture) do not merge continuously into each other. Political and administrative units do not in any sense exist as part of the physical substrate of reality, but rather only as a product of our fiats. Moreover Smith and Varzi (2000) show that, even leaving aside all problems connected with the issue of the cognitive dependence of fiat objects, the fiat–bona fide dichotomy can be preserved

in light of the fact that fiat objects satisfy topological principles which are clearly distinct from the standard topological principles satisfied by bona fide objects. Much work needs to be done in order to understand these matters fully. Much work needs to be done, above all, on the problematic cases, such as mountains and valleys, which belong clearly neither to the bona fide nor to the fiat side of our dichotomy. But the dichotomy itself will stand.[15]

Notes

[1] We are to imagine Bill Clinton as a convex tube whose midriff is characterized by neither qualitative differentiation nor edges or folds.

[2] From *Template Atlas of the Human Brain* (http://rprcsgi.rprc.washington.edu/~atlas). Copyright 1996 University of Washington.

[3] Hofstadter and McKinsey (1939) propose a distinction (taken up also by Kenny 1975) between two kinds of imperatives: fiats and directives, where the latter, but not the former, are imperatives directed towards some particular person or group of persons. An example of a fiat in this sense is the Biblical *'fiat lux'*, or an utterance of the King, to no one in particular, 'a horse, a horse', or 'off with his head', or 'let justice be done' (*fiat justitia*).

[4] Details are provided in Smith and Varzi (2000), which also sets forth the formal differences between the coincidence of boundaries in the fiat realm and the mere proximity of boundaries which is achievable in the realm of physical bodies.

[5] The theory of fiat boundaries can thus serve as a contribution to the formal theory of the common-sense world of the sort that is presented in Hobbs and Moore (1985).

[6] As Lakoff writes: 'One of the cornerstones of the objectivist paradigm is the independence of metaphysics from epistemology. The world is as it is, independent of any concept, belief, or knowledge that people have. Minds, in other words, cannot create reality. I would like to suggest that this is false and that it is contradicted by just about everything known in cultural anthropology.' (p. 207) Lakoff goes on to admit that the thesis that 'mind creates reality' does not in fact apply in relation to ultimate physical reality; it applies, rather, only in relation to the reality of human institutions. Even in regard to human institutions, however, in contrast to what Lakoff has to say, *our thinking does not make it so*. (See Smith and Searle 2001.)

[7] Stove calls this argument 'the gem'. For a discussion of its many forms see his (1991).

[8] Documented in Rea (1997).

[9] On the notion of boundary-dependence see Smith (1992), which includes an early version of this resolution of the Tibbles problem, which has affinities also with the solution presented by van Inwagen in his (1981).

[10] A detailed formal theory of truthmaking along these lines is presented in Smith (1999a).

[11] I shall confine myself here to informal consideration of these matters, more formal treatments having been presented elsewhere. (Smith 1997, Smith and Varzi 2000)

[12] It is the possibility of such asymmetrical boundaries which above all distinguishes the non-standard topology sketched by Brentano in his (1988).

[13] Compare the following passage (from Lewis Carroll, *Sylvie and Bruno*):

> The Bellman himself they all praised to the skies –
> Such a carriage, such ease and such grace!

Such solemnity, too! One could see he was wise,
The moment one looked in his face!

He had bought a large map representing the sea,
Without the least vestige of land:
And the crew were much pleased when they found it to be
A map they could all understand.

"What's the good of Mercator's North Poles and Equators,
Tropics, Zones, and Meridian Lines?"
So the Bellman would cry: and the crew would reply
"They are merely conventional signs!

"Other maps are such shapes, with their islands and capes!
But we've got our brave Captain to thank"
(So the crew would protest) "that he's bought us the best –
A perfect and absolute blank!"

This was charming, no doubt: but they shortly found out
That the Captain they trusted so well
Had only one notion for crossing the ocean,
And that was to tingle his bell.

[14] Details are presented in Brendan Whyte's forthcoming University of Melbourne Ph. D. dissertation on existing world enclaves.

[15] The ideas in what follows were inspired by the theory of boundaries and the continuum sketched in Brentano (1988) and in Chisholm (1989). They were first presented in raw form and without the terminology of the fiat/bona fide dualism in my (1992). An extended formal theory of fiat boundaries was then developed in my paper in the Chisholm volume of the *Library of Living Philosophers* (1997), and coupled with a formal theory of bona fide boundaries in Smith and Varzi (2000). The account of fiat objects in geography presented here draws on two conference papers on fiat objects (Smith 1994 and Smith 1995). I am grateful to Berit Brogaard, David Mark, Andrew Turk, Achille Varzi, Laure Vieu and Wojciech Zelaniec for helping me to clarify my ideas on fiat objects, and also to the NSF, which supported research on this paper under Grant BCS-9975557: "Geographic Categories: An Ontological Investigation".

References

Bird, A. (1996), 'Squaring the Circle: Hobbes on Philosophy and Geometry', *Journal of the History of Ideas* 57: 217–231.

Bittner, T. (2000), 'Approximate Qualitative Temporal Reasoning', forthcoming in *Annals of Mathematics and Artificial Intelligence*,

Brentano, F. (1988) *Philosophical Investigations on Space, Time and the Continuum*, English translation by B. Smith, London/Sydney: Croom Helm.

Casati, R., and Varzi, A. C. (1994), *Holes and Other Superficialities*, Cambridge (MA): MIT Press.

Casati, R., and Varzi, A. C. (1999), *Parts and Places. The Structures of Spatial Representation*, Cambridge (MA): MIT Press.

Chisholm, R. M. (1989), *On Metaphysics*, Minneapolis: University of Minnesota

Press.
Comrie, B. (1976), *Aspect. An Introduction to the Study of Verbal Aspect and Related Problems*, London and New York: Cambridge University Press.
Edgerton, S. (1975), *The Renaissance Rebirth of Linear Perspective*, New York: Basic Books.
Fine, K. (1975), 'Vagueness, Truth and Logic,' *Synthese* 30: 265–300.
Frege, G. (1884), *Die Grundlagen der Arithmetik*, Breslau: Koebner; English translation by J. L. Austin: *Foundations of Arithmetic*, Oxford: Blackwell, 1959.
Gärdenfors, P. (2000), *Conceptual Spaces. The Geometry of Thought*, Cambridge (MA): MIT Press.
Gibson, J. J. (1979), *The Ecological Approach to Visual Perception*, Boston: Houghton-Mifflin.
Hering, E. (1964), *Outlines of a Theory of the Light Sense*, English translation by L. M. Hurvich and D. Jameson, Cambridge (MA): Harvard University Press.
Hobbs, J. R., and Moore, R. C., eds. (1985), *Formal Theories of the Commonsense World*, Norwood: Ablex.
Hofstadter, A., and McKinsey, J. C. C. (1939), 'On the Logic of Imperatives', *Philosophy of Science* 6: 446–457.
Kenny, A. (1975), *Will, Freedom and Power*, Oxford: Blackwell.
Lakoff, G. (1987), *Women, Fire, and Dangerous Things*, Chicago: University of Chicago Press.
Langacker, R. (1987/1991), *Foundations of Cognitive Grammar*, 2 volumes, Stanford: Stanford University Press.
McGee, V. (1997), '"Kilimanjaro"', *Canadian Journal of Philosophy* 23 (Suppl.), 141–195.
Meinong, A. (1899), 'Über Gegenstände höherer Ordnung und deren Verhältnis zur inneren Wahrnehmung', *Zeitschrift für Psychologie und Physiologie der Sinnesorgane* 21: 182–272.
Mourelatos, A. P. D. (1981), 'Events, Processes and States', in P. J. Tedeschi and A. Zaenen (eds.), *Tense and Aspect* (*Syntax and Semantics*, Vol. 14), New York: Academic Press, pp. 191–211.
Ojeda, A. (1993), *Linguistic Individuals*, Stanford: CSLI Publications.
Quine, W. V. O. (1969), 'Ontological Relativity,' in *Ontological Relativity and Other Essays*, New York: Columbia University Press, pp. 26–68.
Rea, M., ed. (1997), *Material Constitution. A Reader*, Lanham (MD): Rowman & Littlefield.
Smith, B. (1987), 'On the Cognition of States of Affairs', in K. Mulligan (ed.), *Speech Act and Sachverhalt: Reinach and the Foundations of Realist Phenomenology*, Dordrecht/Boston/Lancaster: Nijhoff, pp. 189–225.
Smith, B. (1992), *'Characteristica Universalis'*, in K. Mulligan (ed.), *Language, Truth and Ontology*, Dordrecht/Boston/London: Kluwer, pp. 50–81.
Smith, B. (1994), 'Fiat Objects', in N. Guarino, L. Vieu, and S. Pribbenow (eds.), *Parts and Wholes: Conceptual Part-Whole Relations and Formal Mereology: 11th European Conference on Artificial Intelligence*, Amsterdam: Euro-

pean Coordinating Committee for Artificial Intelligence, pp. 15–23.
Smith, B. (1995), 'On Drawing Lines on a Map', in A. U. Frank, W. Kuhn and D. M. Mark (eds.), *Spatial Information Theory. Proceedings of COSIT '95*, Berlin: Springer-Verlag, pp. 475–484.
Smith, B. (1995a), 'More Things in Heaven and Earth', *Grazer Philosophische Studien* 50: 187–201.
Smith, B. (1997) 'Boundaries', in L. H. Hahn (ed.), *The Philosophy of Roderick Chisholm*, LaSalle (IL): Open Court, pp. 534–561.
Smith, B. (1997a), 'The Cognitive Geometry of War', in P. Koller and K. Puhl (eds.), *Current Issues in Political Philosophy: Justice in Society and World Order*, Vienna: Hölder-Pichler-Tempsky, pp. 394–403.
Smith, B. (1999), 'Agglomerations', in C. Freksa, and D. M. Mark (eds.), *Spatial Information Theory. Cognitive and Computational Foundations of Geographic Information Science. Proceedings of COSIT '99*, Berlin: Springer Verlag, pp. 267–282.
Smith, B. (1999a), 'Truthmaker Realism', *Australasian Journal of Philosophy* 77: 274–291.
Smith, B., and Brogaard, B. (2001), 'A Unified Theory of Truth and Reference', *Logique et Analyse*, forthcoming.
Smith, B., and Mark, D. M. (1999), 'Ontology with Human Subjects Testing: An Empirical Investigation of Geographic Categories', *American Journal of Economics and Sociology* 58: 245–272.
Smith, B., and Searle, J. R. (2001) 'The Construction of Social Reality: An Exchange', *American Journal of Economics and Sociology* 59, in press.
Smith, B., and Varzi, A. C. (1999), 'The Niche', *Noûs* 33: 198–222.
Smith, B., and Varzi, A. C. (2000) 'Fiat and Bona Fide Boundaries', *Philosophy and Phenomenological Research* 60: 401–420.
Stove, D. (1991), *The Plato Cult and Other Philosophical Follies*, Oxford: Blackwell.
Talmy, L. (1995), 'Fictive Motion in Language and "Ception"', in P. Bloom, M. A. Peterson, L. Nadel, and M. F. Garrett (eds.), *Language and Space*, Cambridge (MA): MIT Press, pp. 211–276.
Talmy, L. (1996), 'The Windowing of Attention in Language', in M. Shibatani and S. Thompson (eds.), *Grammatical Constructions: Their Form and Meaning*, Oxford: Oxford University Press, pp. 235–287.
van Inwagen, P. (1981), 'The Doctrine of Arbitrary Undetached Parts', *Pacific Philosophical Quarterly* 62: 123–137; reprinted in Rea, ed. (1997), pp. 191-208.
Varzi, A. C. (2001), 'Vagueness in Geography', *Philosophy and Geography* 4: 49–65.