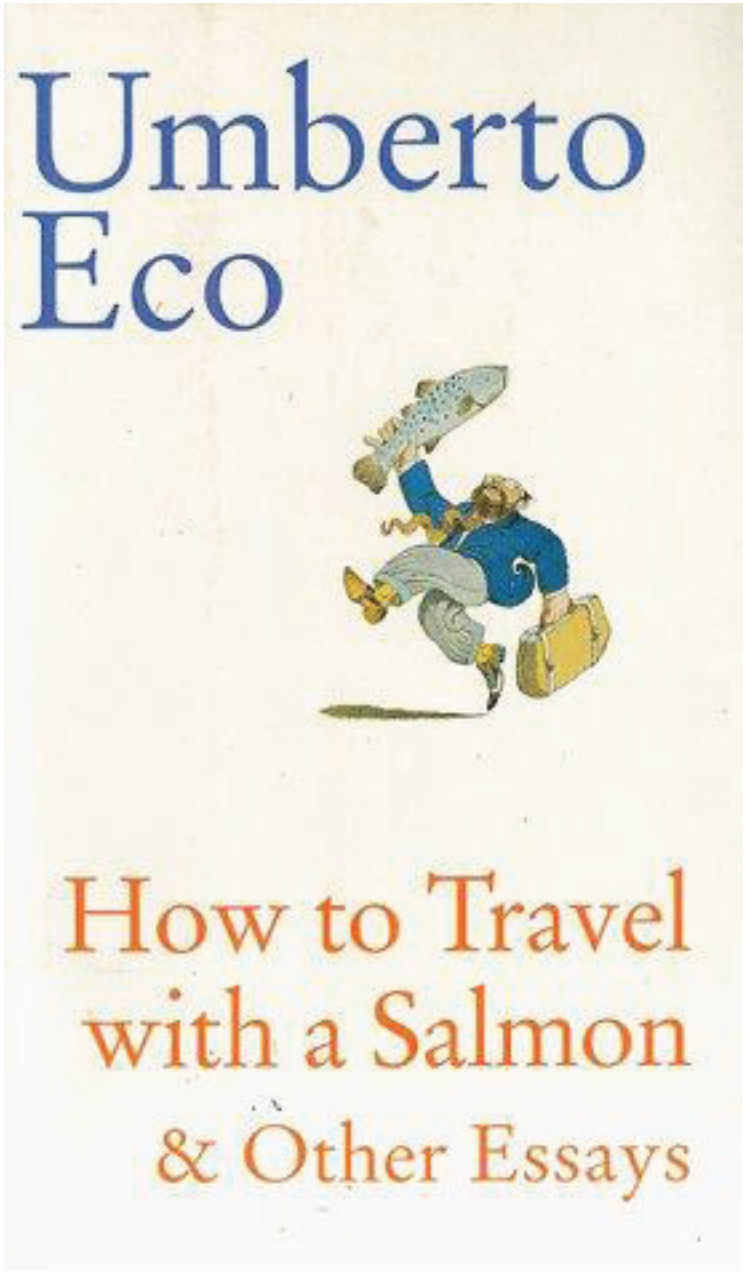

On the Impossibility of Drawing a Map of the Empire on a Scale of 1 to 1

". . . in that Empire, the Cartographer's art achieved such a degree of perfection that the Map of a single Province occupied an entire City, and the Map of the Empire, an entire Province. In time, these vast Maps were no longer sufficient. The Guild of Cartographers created a Map of the Empire, which perfectly coincided with the Empire itself. But Succeeding Generations, with diminished interest in the Study of Cartography, believed that this immense Map was of no use, and not Impiously, they abandoned it to the Inclemency of the Sun and of numerous Winters. In the Deserts of the West ruined Fragments of the Map survive, inhabited by Animals and Beggars; in all the Country there is no other Relic of the Geographical Disciplines."

(from Viajes de Varones Prudentes, *Suárez Miranda, book IV, chap. XIV, Lérida, 1658. Quoted by Jorge Luis Borges, Historia universal de la infamia "Etcetera," Buenos Aires, 1935).*

1. *Requirements for a 1:1 Map*

Herein is discussed the theoretical possibility of a map of the empire on a scale of 1 to 1, assuming these postulates:

1. That the map be, in fact, one to one, and therefore coextensive with the territory of the empire.

2. That it be a map and not a plaster cast; in other words, dismissing the possibility of covering the surface of the empire with a malleable material reproducing every relief, even minimal. In this case the project would be considered, not cartography, but rather the packaging or paving of the empire, and it would thus be more appropriate legally to decree the empire a map of itself, with all the consequent semiotic paradoxes.

3. That the empire in question be that X than which *nihil maius cogitari possit,* and hence that the map cannot be produced and spread out in a desert area of a second, separate empire X2 such that $X_2 > X$ (as if a 1:1 map of the Principality of Monaco were to be spread out in the Sahara). In this case the project would lose all theoretical interest.

4. That the map be faithful, depicting not only the natural reliefs of the empire but also its artifacts, as well as the totality of the empire's subjects (this last is an ideal condition, which may be discarded in the production of an impoverished map).

5. That it be a map and not an atlas with partial pages. In theory there is nothing to prevent the realization, over a reasonable amount of time, of a series of partial projections on separate sheets, to be used individually for reference to different portions of the territory. The map may be produced on separate sheets, but only on condition that they be sutured in such a way as to construct the overall map of the entire territory of the empire.

6. That the map, finally, be a semiotic tool—that it be capable, in other words, of signifying the empire or of allowing references to the empire, especially in those instances when the empire is not otherwise perceptible. This last condition means that the map cannot be a transparent sheet in any way fixed over the territory on which the reliefs of the territory itself are projected point by point; for in that case any extrapolation carried out on the map would be carried out at the same time on the territory beneath it, and the map would lose its function as maximum existential graph.

It is therefore necessary that (i) the map not be transparent; or that (ii) it not lie on the territory; or, finally, that (iii) it be adjustable in such a way that the reference points of the map lie on points of the territory that are not the ones they indicate.

It will be demonstrated that each of these three conditions involves insuperable practical difficulties and theoretical paradoxes.

2. *Methods of Production of the Map*

2.1 *Opaque Map Spread Out Over the Territory*

As it is opaque, this map would be perceptible while perception of the underlying territory would be obscured, but by creating a membrane between the territory and the sun's rays or any atmospheric precipitation, it would alter the ecological equilibrium of the territory itself. Such a map would therefore depict the territory differently from its actual state. The constant correction of the map, theoretically possible in the case of a suspended map (cf. 2.2), is in this case impossible: the alterations of the territory could not be perceived through the opacity of the map. Thus the observer would make inferences about an unknown territory from an unfaithful map. If, finally, the map must include the inhabitants as well, it would for this same reason prove once again unfaithful as it would represent an empire inhabited by subjects who, in reality, inhabit the map.

2.2 *Suspended Map*

On the territory of the empire stakes would be erected, of a height equal to its highest relief points, and over the upper ends of the stakes would be extended a cartaceous or linen surface on which, from below, the features of the territory would be projected. Such a map could be used as a sign of the territory, since, to inspect it, one must raise one's eyes, turning one's gaze away from the corresponding territory. In practice, however (and this is a consideration that would apply also to the spread-out, opaque map, if it were not made impossible by other, more cogent arguments), since each portion of the map could be consulted only by those residing in the corresponding portion of the territory, the map would not allow the reception of information about parts of the territory different from those where the map is being consulted.

The problem could be overcome by surveying the map from above: but (apart from [i] the difficulty of emerging with kites or guided balloons from a territory entirely covered by a cartaceous or linen surface; [ii] the necessity of making the map equally legible from above and from below; and [iii] the fact that the same cognitive result could easily be achieved flying over a territory without a map) any inhabitant who flew over the map, abandoning for this purpose the territory itself, would automatically make the map inaccurate, because it would then represent a territory having a number of inhabitants superior, at least by one, to that obtaining at the moment of the aerial observation. Such a solution would thus be possible only with an impoverished map that did not depict the subjects.

Finally, if the suspended map were opaque, the same objection raised for the extended map would be valid: preventing the penetration of solar rays and atmospheric precipitation, it would alter the ecological equilibrium of the territory and thus become an unfaithful representation of it.

The subjects could obviate this problem in two ways: either (i) by producing every single part of the

map, once all the stakes were in place, in a single moment of time at every point in the territory, so that the map would remain faithful at least in the instant when it is completed (and perhaps for many successive hours); or else (ii) by arranging for ongoing correction of the map based on the modifications of the territory. But in this second case, the corrective activity of the subjects would involve them in migrations that the map could not record, and unless it were an impoverished version, it would become unfaithful once more. Furthermore, occupied in constant revision of the map, the subjects could not deal with the ecological decline of the territory; the activity of map revision would lead to the extinction of all the subjects—and therefore of the empire.

A similar situation would arise if the map were of transparent and permeable material. It would be impossible to study in the daytime, because of the glare of the sun's rays, and any colored area that reduced the glare would inevitably diminish the action of the sun on the territory below, provoking at the same time ecological transformations of lesser extent but of equal theoretical impact on the fidelity of the map.

We have overlooked the possibility of a suspended map capable of being folded and unfolded in a different orientation. This solution would no doubt eliminate many of the difficulties discussed above, but, even if technically different from the folding map of the third category, it would prove physically more cumbersome. It would in any case involve the same paradoxes of folding that arise with this third type of map, and would be open to the same objections.

2.3 *Transparent Map, Permeable, Extended, and Adjustable*

Let us imagine that such a map, drawn on transparent and permeable material (gauze, for example), is spread out over the surface and is adjustable.

In any case, once the map has been drawn and spread out, either the subjects remain on the territory beneath it, or they climb on top of it. But if the subjects were to prepare the map while it is above their heads, not only would they be unable to move, because every movement would alter the positions of the subjects that the map describes (unless we have recourse, once again, to an impoverished map), but further, in moving, they would cause tangles in the very fine membrane above them, resulting in serious discomfort and once more making the map unfaithful: it would assume a different topological configuration, producing disaster areas not corresponding to the planimetry of the territory. It must therefore be supposed that the subjects have produced and extended the map while remaining on top of it.

In this case we can adduce numerous paradoxes already considered in connection with the previous maps: the map would represent a territory inhabited by subjects who in reality inhabit the map (unless it is a summary, or impoverished, map); the map could not be consulted because each subject could examine only the part corresponding to the territory on which subject and map lie; the map's transparency would eliminate its semiotic function, since it would be functional as sign only in the presence of its own referent;

residing on the map, the subjects could not tend the territory, which would deteriorate, making the map unfaithful. . . . It is necessary, then, for the map to be capable of being folded and then reopened with a different orientation, so that every point X of the map representing a point Y of the territory can be consulted when the point X of the map lies on any point Z of the territory, where $Z \neq Y$. Folding and unfolding, finally, permit long periods of time when the map is not being consulted and does not cover the territory, and thus allow the cultivation and maintenance of territory necessary to keep its actual configuration always the equivalent of the one depicted on the map.

2.4 *Folding and Unfolding the Map*

Certain preliminary conditions must be postulated: (i) that the reliefs of the terrain allow the free movement of those subjects assigned to folding; (ii) that a vast central desert exist, where the folded map can be stored and where it can be turned when it must be unfolded again in a different orientation; (iii) that the territory have the form either of a circle or of a regular polygon, so that the map, however oriented, will not exceed its boundaries (a 1:1 map of Italy, shifted ninety degrees, would be spread out over the Mediterranean); and (iv) that, as an inevitable consequence, the map will have a central point, lying always on the same portion of the territory that it represents.

Once these conditions have been satisfied, the subjects can move en masse towards the farthest boundaries of the empire to avoid the map's being folded up with subjects inside. To avoid potential over-

crowding when the subjects are all clustered at the edges of the map (and of the empire), we must postulate an empire inhabited by a number of subjects not superior to the number of measuring units of the total perimeter of the map, the perimetric unit of measurement being equivalent to the space occupied by one subject in a standing position.

Now suppose that each subject grasps a bit of the edge of the map and begins folding it, while retreating further and further. A critical point would be reached at which the subjects would all be crammed together at the center of the territory, standing on top of the center of the map and supporting its folded edges above their heads: a situation aptly termed scrotum catastrophe, as the entire population of the empire is enclosed in a little transparent sac, in a situation of theoretical stalemate and of considerable physical and psychological discomfort. The subjects must therefore, as the folding gradually proceeds, leap instead outside the map and onto the territory itself, where they will continue folding from outside, until the final stages of the folding, when no subject remains inside the sac.

But this solution would inevitably produce the following situation: the territory would consist, once folding is completed, of the original terrain, plus an enormous folded map in its center. Thus the folded map, no longer consultable, would prove unfaithful as well, because it is known for certain that it would represent the territory without its folded self in the center. And there is no apparent reason why a map should be unfolded and consulted when it is known

a priori to be unfaithful. On the other hand, if the map were to depict the territory with itself folded in the center, it would immediately become unfaithful every time it was unfolded.

It could be assumed that the map is subject to a principle of indetermination, for it is the act of unfolding that makes a map faithful whereas, when folded, it is unfaithful. In this situation the map could be unfolded whenever there was a desire to make it faithful.

There still remains, however (unless we have recourse to the partial, or summary, map), the problem of the position to be assumed by the subjects after the map has been unfolded and laid out with a different orientation. For it to be faithful each subject, once the unfolding is completed, must assume the position he had, at the moment of its creation, on the actual territory. Only at this cost will a subject resident at point Z of the territory—on which, say, a point X_2 of the map lies—be depicted exactly at point X_1 of the map that currently lies, for example, on point Y of the territory. At the same time, every subject could obtain information from the map about a point of the territory different from the one where he resides—and about a subject different from himself.

Toilsome as it may be, and full of practical difficulties, this solution makes the transparent and permeable map, spread out and adjustable, the best prospect, while obviating any need to settle for a summary map. But this map, too, like the previously mentioned ones, falls victim to the Normal Map paradox.

3. *The Paradox of the Normal Map*

When the map is installed over all the territory (whether suspended or not), the territory of the empire has the characteristic of being a territory entirely covered by a map. The map does not take account of this characteristic, which would have to be presented on another map that depicted the territory plus the lower map. But such a process would be infinite (the "third man" argument). In any case, if the process stops, a final map is produced that represents all the maps between itself and the territory, but does not represent itself. We call this map the Normal Map.

A Normal Map is subject to a quasi-Russell-Frege paradox: every territory, plus a map representing it, can be seen as a normal set (the map does not belong to the set of objects that constitute the territory). But we cannot conceive sets of normal sets. Therefore we should think either of a not-normal set, in which the final map is part of the territory it represents (which is false, otherwise it should also represent itself) or of a normal set in which the final map is necessarily unfaithful, as explained above.

Two corollaries follow:

1. Every 1:1 map always reproduces the territory unfaithfully.

2. At the moment the map is realized, the empire becomes unreproducible.

It could be remarked that, with the second corollary, the empire fulfills its own most secret dream, that of making itself imperceptible to enemy empires; but thanks to the first corollary it would become imperceptible to itself as well. We would have to postulate an empire that achieves awareness of itself in a sort of transcendental apperception of its own categorial apparatus in action. But that would require the existence of a map endowed with self-awareness, and such a map (if it were even conceivable) would itself become the empire, while the former empire would cede its power to the map.

Third corollary: every 1:1 map of the empire decrees the end of the empire as such and therefore is the map of a territory that is not an empire.

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