From:

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Fractal Narrative

About the Relationship Between Geometries and Technology and Its Impact on Narrative Spaces

August 2014, 396 p., 44,99 €, ISBN 978-3-8376-2829-6

Fractals suggest recursivity, infinity and the repetition of a principle of order. They are digital pictures of the universe's continuous movement ignored by mankind during millennia.
This book investigates the relationship existing between geometries and technology, and how it guided cognitive processes and thus the organization of narrative spaces. The author proposes a new approach for the study of media remarking that from Bacon's camera obscura to von Neumann's computers both geometries and technology strongly influenced the organization of narrative spaces, which acquired a fractal character.

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Preface

Fractals suggest recursivity, infinity and the repetition of a principle of order. But they are not just infinite images, wonderful infinite images in a space. They are processes. Fractals are digital pictures of the universe's continuous movement. Attempting to explain the state of fractals, one can only posit that their state is pure becoming. For this reason fractal geometry was understood as a geometry that can recognize nature, its irregular shapes, its perpetual mutation and its chaotic characteristics.

The present work attempts to demonstrate that fractals are more than an instrument of scientists, more than just one of the features of our scientific context. Indeed, these forms have accompanied mankind over millennia. Consider, for instance, not only the fractal shape of mountains, trees and human lungs, but also Islamic art, African architecture, Hokusai's works and many other artistic expressions that are able to display these infinite forms and show us that they are also part of mankind's deepest unconscious.

Notwithstanding the irregularity and infiniteness of nature, starting from the 4th century B.C. onwards, philosophy developed a linear thought called logic and opposed the *alogon* to it. According to this framework, what is not linear is inexplicable and therefore a paradox. At the same time, geometry and mathematics developed a science able to explain nature and natural phenomena through abstract and simple forms that do not exist in nature, that is, through lines that only exist in the human mind. As a result, the *logos* became the only rule and was considered the only truth. Geometry, which was an indispensable instrument for analyzing nature, was also governed by logic, mostly embodied in the axioms of Euclid.

Through geometry, 'real things,' fruits of the observation of nature, were identified with the fruits of the intellect, that is, with geometrical figures that, in turn, were perceived as 'real.' As a consequence, geometry could create 'reality' through abstractions, through figures created by the intellect. At that point, the rational translation of natural objects through the science of geometry started to be seen as an objective translation of nature. This impression of objectivity, derived from a kind of Pythagorean thought in which nature can be translated into numbers, started to impose a new relationship between man and nature. On the one hand, one started to see nature as a regular entity that could be embraced by *logos*. On the other hand, one assumed that the human senses where insufficient to understand some phenomena. Therefore, ge-

ometry was employed to translate objects and phenomena onto another plane where human perception could analyze them.

The idea that nature could be translated into the language of numbers generated the erroneous conception that natural processes are regular, that is to say, that they can be predicted and imitated by finding their correspondence with numbers or Euclidean geometrical figures. This idea is exemplified by the Greek concept of truth (*aletheia*), the literal meaning of which is 'the state of not being hidden, of being evident,' or in Heidegger's translation, the state of '*Unverborgenheit*.'

This concept of truth governed mankind's relationship with nature from the classical period up to the Modern Age. During this period, truth and nature were seen as eternal and immutable entities that could only be understood by decoding them using numbers. Thus, nature could only be contemplated, because only through contemplation could mankind decipher it and disclose its secrets. Consequently, the scientific knowledge, namely the *theoria* of the Greeks and the *contemplatio* of the Romans, subdued the *praxis*.

However, through the mediation of Christian thought, in the Modern Age, scientific knowledge was no longer understood as the *fine ultimo* to which *praxis* should be subordinated. *Theoria* and *contemplatio* became operative instruments. From that moment on, man began seeing his presence in the world as a chance – almost as a mission – to become the 'dominator' of nature. And man's supremacy over nature is expressed in his act of making truth. This truth is no longer the Greek *aletheia*, but the Hebrew *'emet'* whose root is strongly related to the verb 'to do.' More specifically, the difference between the Greek and Hebraic truths lies in that the first one is something that man 'knows,' whereas the second is something in the sphere of what man 'practices.' In the Hebrew conception of truth, there is something formed in time, something created in time and by time, which implies that every historical period generates its own truth. The old idea of an untouchable and everlasting truth was replaced by a completely different concept. The human being acquired the capacity to 'act' upon nature thus establishing a continuous creation of truth. Therefore, scientific knowledge also started to be understood as a means to improve technology with the aim of creating truth by transforming nature. But if technology represented the only means to transform nature and supply human sensorial weakness, then geometry represented the instrument to translate nature 'objectively.' In addition, geometry was a means to improve – and also to prove – the efficacy of technology, which, in turn, offered the possibility to study, represent and simulate the human body and its functions. Consider, for instance, the technique of perspective developed during the Renaissance, which, by applying the geometrical rules developed by Euclid, allowed not only the analysis of the human sense of sight, but also its representation and simulation.

During the Renaissance, the desire to represent natural objects with a high degree of objectivity created a different relationship with nature. The Renaissance took on as a goal the construction of an image on a two-dimensional surface able to produce for the beholder an illusion of a three-dimensional object, a simulation of our perception of natural objects. The principal aim of perspective was to achieve a perfect transla-

tion of nature in order to produce in the beholder, in Gombrich's words, an effect 'akin to visual hallucination.' Perspective aims to attain the correct equation such that the image appears like the object and the object like the image. In addition, this technique generates a kind of mechanization of the representation of natural objects. It was a mechanization of the natural function of sight that was simulated through the device of the camera obscura. As a prosthesis able to realize translations of nature, which are seen as objective due to its scientific component, the camera obscura started a phenomenon of alienation of mankind from the representation of the world. The camera obscura represents the first of a series of visual media that translated nature under a Euclidean *ordino*.

In the field of cinematographic studies, when the formalist influence on the study of cinematography came to an end, some narrative constructions started to be seen as narrative constructions that do not represent Euclidean spaces. In other words, it became quite clear that even though the cinematographic camera was a direct heir of the camera obscura and, for this reason, a geometrical machine governed by Euclidean rules, it was able to develop non-Euclidean narrative spaces that share some features with fractal forms.

The primary aim of the present work is to analyze the influence of fractal geometry on the organization of contemporary narrative spaces. As noted by Simmel (see Simmel G. 1908, esp. pp. 614-708), society is not only developed into the space – that is, the social space is not only a spatial manifestation or development – but it also constructs a spatial organization that is perceptible. Certainly, technology and geometry play a fundamental role in the construction of the social space. Our society, strongly influenced by contemporary mass media, has started to see a new way to articulate narrative spaces, displaying a type of organization that I call in this text fractal. In my view, society is moving towards the construction of fractal social spaces that will, in the near future, completely modify social dynamics and structures, class struggles, and so on. At the moment, we see only one aspect of the impact that fractal geometry has on the organization of narrative spaces: on the aesthetics of some narrative constructions and on the creation of open spaces for discussion and sharing information. My research, by analyzing the symbiosis between man and technology and between man and geometry, aims at developing an instrument of analysis that could represent a new way to understand the contemporary narrative act, which is no longer the creation of a linear succession of information governed by fixed Euclidean rules, but the construction of infinite fractal spaces in which man and technology establish a new relationship.

In the first part, I first outline the development of geometry, Euclid's contribution, as well as the scientific research that allowed the theorization of non-Euclidean geometries. After that, I deal with the fundamental concepts of topology and proto-fractal objects that in the 1970s allowed Benoit Mandelbrot to create fractal geometry.

The second part is focused on the development of the technological devices that influenced the analysis of space and allowed the theorization of new kinds of struc-

tures, new ways of organizing the universe. Each visual medium considered in this second part is analyzed from a historical point of view that enables us to highlight a common process shared by all the devices discussed. Indeed, every visual medium was developed within the scientific field with the purpose of improving mankind's analysis of nature. As prostheses that supplies human sensorial weakness, these apparatuses represented extensions of the human senses and allowed a better understanding of nature and natural phenomena. However, when these apparatuses are introduced to the large public, they become narrative instruments that not only modify the social understanding of 'objective representation' but also influence the way mankind constructs narrative spaces, the way mankind communicates. Particular attention is drawn to the microscope, which influenced Leibniz's theories of *Analysis Situs* and Monadology, through which I analyze important characteristics of fractal objects that are present in the organization of some narrative spaces. But I also deal with the invention of the cinematographic camera, which allowed Bergson to theorize a new universal structure, and the Panorama, the aim of which was to concentrate in a single place huge quantities of information, always attempting to create an infinite space where information could be preserved.

The third part of this work focuses on the introduction of non-Euclidean geometries into art, on the way fractal spaces can be illustrated through pictorial representations, and on how these spaces, particularly as displayed in African art, were introduced into and interpreted by Western artistic expression. I also examine some scientific theories, like Poincaré's *Analysis Situs,* and how these theories were incorporated into artistic expression. From there I am able to start an analysis on the influences of both Euclidean geometry and linguistics on the organization of narrative spaces, and on how Deleuze, by analyzing the cinematographic camera as an instrument able to construct non-Euclidean spaces, made possible the understanding of audiovisual narrative as a pure spatial organization, which, after the Second World War, started to be organized following some non-Euclidean laws. Following in the footsteps of Deleuze, I attempt to create a parallel between the development of non-Euclidean geometries and the audiovisual narrative spaces constructed after the Second World War. The comparison between the development of non-Euclidean geometries and the construction of non-Euclidean narrative spaces takes into account the role played by technology. I theorize that every technological improvement generated a new way of organizing narrative spaces. Thus, I argue that video technology enabled the development of a kind of image that shares some characteristics with Proto-Fractal objects. I analyze the digital image and the organization of audiovisual narrative spaces through a comparison with the characteristics of fractal forms. In this part, I used as a framework the theory developed in the text to analyze some mainstream films. While analyzing these films, I also attempt to highlight the existence of fractal narratives and how they function. Indeed, even though the narrative spaces developed in the films under analysis have already been studied, I decode them in a completely new way, that is, through the innovative instrument of analysis offered by fractal geometry.

The fourth and last part is focused on the current status of audiovisual narrative. I deal in particular with the narratives developed in recent times on the World Wide Web, and I inquiry into the social role that these narratives play and can play in the future. I also propose a geometrical demonstration of the fractal narrative in order to better define its essence and potentialities.