

THE DIAGRAM AS AN ABSTRACT MAP

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4 Topology, a branch of mathematics, studies the property of objects that are preserved through continuous deformation, such as bending, twisting or stretching. It can be used to study the inherent connectivity of objects in any dimensional space, while ignoring their detailed form or shape. Topology studies the characteristics of figures, or topological surfaces, such as the Klein bottle, the Möbius strip, or the torus.

1 *The Diagrams of Architecture: AD reader*, Mark Garcia, ed., (Chichester: Wiley, 2010).

2 Georges Teyssot, with Samuel Bernier-Lavigne, « Forme et information. Chronique de l'architecture numérique, » in : *Action Architecture*, (dir.) Alain Guiheux, (Paris, Éditions de la Villette, 2011), 49-87.

3 Manuel De Landa, "Deleuze and the Use the Genetic Algorithm in Architecture," *Architectural Design*, 2002 Jan., vol.72, no.1, 9-12; reprint: Id., in *Contemporary Techniques in Architecture*, Ali Rahim, ed., (London / New York: Wiley-Academy, 2002), 9-12; reprint: Id., *Rethinking Technology. A Reader in Architectural Theory*, William W. Braham, Jonathan A. Hale, eds., (London & New York: Routledge, 2007), 407-412.

5 Gilles Deleuze, *Difference and Repetition*, trans. Paul Patton (New York: Columbia University Press, 1994), 36.

Whether graph or chart, the architectural diagram is today an ubiquitous presence. As graphic inscription of abstraction in space, since the 1990s, the notion of diagram has been so much extended that now it nearly encompasses every aspect of design. To think of the diagram as an architecture of ideas, (or, more classically, the idea of architecture), means to be still ensconced in some sort of platonic conceptions.¹ To avoid this trap, a first step would be to turn to Gilles Deleuze's notion of the diagram as an abstract map, and to show how the model acquires its meaning, specifically when confronted with biological paradigms. Such understanding may lead to a better comprehension of the present algorithmic nature of diagrams. These scripted procedures refer to form, or, more precisely, to processes of morphogenesis. Their aim is to enhance a modulation between natural components, physical elements, and architectural design. A range of practices (or protocols), based on adaptable (customable) software, capable of producing changing modalities of a structural topology driven by performance, are currently available.² For instance, addressing the issue of the use of genetic algorithm in design, Manuel De Landa, inspired by Deleuze's work, has proposed to introduce three theoretical levels of complexity: to think in terms of population (not the individual); to think in terms of differences of intensity (thermodynamic and entropic); lastly, to think in terms of topology.³ The question addressed here will be therefore to know if (and how) the diagram is able to topologise the various fields of design.⁴

MORPHOGENESIS

As Deleuze writes in *Difference and Repetition* (1968), we live in a world dominated, by "a completely other distribution which must be called nomadic, a nomad *nomos*, without property, enclosure or measure."⁵ The problem today is no longer the distribution of things and division of persons in sedentary spaces, "but rather a division among those who distribute *themselves* in an open space – a space which is unlimited, or at least without

6 Deleuze, *Difference and Repetition*, 36.

7 Ibidem, 37.

8 Ibidem, 225.

9 Ibidem, 224.

10 Ibidem, 225 and 229. Georges Teyssot, "Gilbert Simondon's Key Points", foreword, viii-xxii, in *Instabilities and Potentialities, Notes on the Nature of Knowledge in Digital Architecture*, Chandler Ahrens, Aaron Sprecher, eds., (New York and London, Routledge, 2019).

11 Anne Sauvagnargues, *Deleuze et l'art*, (Paris : Presses universitaires de France, 2006), 88-89.

12 Gilles Deleuze, "On Gilbert Simondon," in: Id., *Desert Islands and Other Texts, 1953-1974* (New York: Semiotext(e), 2004), 86-9.

13 Deleuze, *Difference and Repetition*, 208-209.

14 Sauvagnargues, *Deleuze et l'art*, cit., 90.

15 Deleuze, *Difference and Repetition*, 214.

16 Ibidem, 216.

17 Ibidem, 214.

precise limits. ... To fill a space, to be distributed within it, is very different from distributing the space.”⁶ The leap from sedentary structures of representation to nomadic distribution, brings unsettling difficulties, transcending all limits, and deploying “an errant and even ‘delirious’ distribution.”⁷ Sedentary distributions, good sense, and common sense, are all based upon a synthesis of time, which has been determined as that of habit.⁸ On the other hand, nomadic structures lead to “mad repartitions ..., mad distribution – instantaneous, nomadic distribution, crowned anarchy or difference.”⁹ Such is the state that physics described in thermodynamics, from Sadi Carnot to Rudolf Clausius and Ludwig Boltzmann (whose equation described the diffusion of gas particles on a statistical method): that is, entropy.¹⁰

For Deleuze, it is necessary to recognize the primacy of multiple forces upon the form. In *Difference and Repetition*, he identifies this link between forces and forms as the two vectors of difference, using Henri Bergson and Gilbert Simondon as sources.¹¹ For Simondon, the individuation of the crystal is the physical formation obtained by a difference in potential. This difference is the entropic arrow between tension and matter (as in a crystal).¹² Deleuze translates this differentiation in terms of oscillation, a simultaneous vibration between the actual and the virtual, which are coexistent. Overcoming Bergson’s opposition between matter and duration, he transposes the arrow of intensity into a model of the coexistence of the virtual and the actual.¹³ Both states are real, but the actual characterizes the completed individual, such as the materialized crystal, while the virtual refers to the problematic field of the pre-individual, when the intensive differentiation is not yet actualized. To illustrate this, Deleuze, following Simondon, uses the model of an egg, the paradigm of an intensive body, literally a body without organs, because it is a body going through phases of differentiation.¹⁴

Actualization occurs in things through a process of differentiation. Embryology shows that the division of an egg into parts is secondary in relation to more significant morphogenetic movements. Deleuze describes the kinematics of an egg, going through its various processes.¹⁵ The differentiation of species and parts presupposes a whole set of spatio-temporal dynamics: “The entire world is an egg.”¹⁶ However, if the world is an egg, then the egg itself is a theater: a stage with actors, spaces, and ideas, and where a spatial drama is played. To substantiate this conclusion, Deleuze employs multiple sources, including Étienne Geoffroy Saint-Hilaire’s thesis on the kinetics of the fold; and Karl von Baër’s hypothesis on morphogenetic movements, including the stretching of cellular layers, invagination by folding, and the orientation and axis of movement, all to be found in the kinematics of the egg.¹⁷ In addition, Deleuze mentions Charles Manning Child’s gradient theory, which offered a framework for thinking about formal arrangement, and Paul Weiss’s paradigm of amphibian

20 Raymond Ruyer, *La Genèse des formes vivantes*, (Paris : Flammarion, 1958), 140; Sauvagnargues, *Deleuze et l'art*, cit., 173, 185.

22 Deleuze, *Difference and Repetition*, 216, 330; see Fabrice Colonna, *Ruyer*, Paris, Les Belles Lettres, 2007.

26 D'Arcy Wentworth Thompson (1860-1948), *On growth and form*, [1917], (Cambridge: University Press; New York: Macmillan, 1942); Id., *On growth and form*, new edition, (Cambridge, UK, The University Press, 1944); id., *On growth and form*, (Cambridge : Cambridge University Press, 1966).

18 Ibidem, 250.

19 Jakob von Uexküll, *A Foray into the Worlds of Animals and Humans: with a Theory of Meaning*, trans. Joseph D. O'Neill, [*Streifzüge durch die Umwelten von Tieren und Menschen*. 1921. English], (Minneapolis: University of Minnesota Press, 2010).

21 Translation: Raymond Ruyer and the Genesis of Living Forms; in: <http://fractalontology.wordpress.com/2007/09/22/ramond-ruyer-and-the-genesis-of-living-forms-knowledge-and-structure/#comments>

23 Deleuze, Ibidem, 222-223, 228-229, 240-241; Sauvagnargues, *Deleuze et l'art*, cit., 90.

24 Deleuze, Ibidem, 250-251.

25 Albert Dalcq, *L'œuf et son dynamisme organisateur* (Paris: Albin Michel, 1941).

27 Albert Dalcq, "Form and Modern Embryology," in Lancelot Law Whyte, *Aspects of Form: a Symposium on Form in Nature and Art* (London: Lund Humphries, 1951); published in collaboration with the Institute of Contemporary Arts (ICA) to coincide with the exhibition "Growth and Form," London, Summer 1951, the title of which was inspired by the new edition of D'Arcy Wentworth Thompson, *On Growth and Form* [1917] (Cambridge, UK: The University Press, 1944).

gastrulation, presented in his 1939 book *Principles of Development*, which elucidates how morphogenetic processes were capable of shaping form.¹⁸

In philosophy, the main source was the work of Raymond Ruyer, who, inspired by Jakob von Uexküll's etiology,¹⁹ had elaborated a philosophy of differentiation already in 1939. For Ruyer, in every domain, form is endowed with a proper rhythm.²⁰ In his 1958 book, *The Genesis of Living Forms*, Ruyer discusses the spatio-temporal dynamism in cellular migration and makes a distinction between morphology and morphogenesis: "Morphology, the study of forms and their arrangements, ... does not present any fundamental difficulty", because it relies on vision and description, while morphogenesis, "presents ... the maximum of difficulty and mystery."²¹ If Deleuze acquired ideas about spatial dramatization and the mystery of differentiation from Ruyer's opus, it is not clear whether the two philosophers agreed that the virtual did not disappear once individuation (and differentiation) were completed.²² For Deleuze, form is not what remains of a physical action, nor is it the result of a depleted force: it is the outcome of a provisional state of equilibrium between forces.²³

As previously indicated, in *Difference and Repetition*, Deleuze attempted therefore to draw a theory of difference, in part based on biological differentiation, giving a new meaning to the ancient mythologies of the world egg, beginning with Anaximander's cosmic egg, while he also provided a renewed interpretation of William Harvey's 1651 biological dictum *ex ovo omnia* ("everything comes from the egg"): "In order to plumb the intensive depths or the *spatium* of an egg, ... the potentials and potentialities must be multiplied. The world is an egg. ... We think that difference of intensity, as this is implicated in the egg, expresses first the differential relations or virtual matter to be organized."²⁴ Moreover, spanning a bridge between their theories, Deleuze relied also on Belgian biologist Albert Dalcq's morphogenetic embryology,²⁵ in addition to Simondon's theory of individuation. Dalcq's epigenesis offered a model for the differentiation *modus operandi*, which was at the heart of Deleuze's thesis. The popularity of Dalcq's work, in the 1950s among artists and architects, was equal to that of D'Arcy W. Thompson's *On Growth and Form* (1917). More a treaty on morphology than a morphogenetic theory, D'Arcy Thompson's volume argued that evolution had been overemphasized as the fundamental determinant of the forms of living beings, and proposed mechanical processes of transformation as equally important in the shaping of life.²⁶

It is noteworthy that Albert Dalcq's book on embryology was the primary source on epigenesis, as much for the designers behind the exhibition, "On Growth and Form," held at the Institute of Contemporary Arts in London in 1951, the title of which was inspired by the new edition of D'Arcy Thompson, *On Growth and Form* (1944), as for Gilles Deleuze.²⁷

- 31 Sauvagnargues, *Deleuze et l'art*, cit., 87-88.
- 28 Alberto Gualandi, « La renaissance des philosophies de la nature et la question de l'humain », in: *Le moment philosophique des années 1960 en France*, Patrice Maniglier, ed., (Paris : Presses universitaires de France, 2011), 59-72.
- 29 Gilles Deleuze, *Francis Bacon: the Logic of Sensation*, trans. Daniel W. Smith, (London / New York: Continuum, 2003), 41.
- 30 Gilles Deleuze, *The Logic of Sense*, trans. Mark Lester, (New York: Columbia University Press, 1990), 88, 342.
- 32 Sauvagnargues, *Deleuze et l'art*, cit., 90.
- 33 Gilbert Simondon, *L'individu et sa genèse physico-biologique*, (Paris: PUF, 1964), 41-42; quoted in Deleuze, *Francis Bacon...*, op. cit., 108.
- 34 Simondon, *L'individu...*, op. cit, 41-42; quoted in Deleuze, *Francis Bacon ...*, op. cit., 165.

Read through the glasses of the philosophies of Spinoza, Leibniz and Bergson, Simondon's theory of individuation helped to identify the egg as a vast metaphor of the world. If Deleuze's philosophy of nature could anticipate the science of his time, it is because he succeeded in identifying the contemporary metaphors that buttressed his conceptualizations, the paradigmatic shifts that were enacted, together with the significant epistemic breakthroughs. Positioned (as he was) in opposition to the overcoded trends of Structuralism, and, at the same time, implicitly contrasting hard-nosed geneticists that read only in codes, Deleuze introduced the egg's metaphor that helped rearticulate the connection between the symbolical and the vital. Without entering the contemporary debate on biology and genetics, it seems that Deleuze theory was not far from the position sustained by the American Stephen Jay Gould's 1977 *Ontogeny and Phylogeny*.²⁸

Deleuze will often use the embryo's model to expose the inorganic vitality of tissues, not yet stabilized in the shape of an organ, capable of multiple transformations: "... the body without organs does not lack of organs, it simply lacks the organism, that is, the particular organization of organs. The body without organs is thus defined by an *indeterminate organ*, whereas the organism is defined by determinate organs."²⁹ In Deleuze's *The Logic of Sense* (1969), everything will collapse around the paradigm of Antonin Artaud, whose poetical, schizoid delirium called for a body beyond its organic determination.³⁰ For Artaud, the completed organism felt like a form that imprisons the body.³¹ During the 1970s, Deleuze and Guattari will never ask anybody to deprive himself of its organs, but to replace the notion of a full-grown organ by the metamorphic and polymorphic conception of an immature organ while it differentiates. Deleuze's bio-philosophy illustrates the virtuality of intensive forces, while they operate before the organic form is achieved and constituted. What Deleuze and Guattari proposed was to consider the virtual axes of informal forces.³²

Resisting the Neo-Platonism of types and models, Deleuze believed that what exists in the world's immanence is not the copy of a model that would constitute the ideal mold of real individuals; that what is real is not the one and unique, or transcendental, but the singularities and the differences. The ideal mold is similar to the ideal type in art history, art, or design. Simondon elaborated a precise criticism of the idea of a mold by introducing the concept of modulation. In modulation, Simondon writes "there is never time to turn something out, to remove it from the mold."³³ To proceed to such a demolding (Fr., *démoulage*) is unnecessary, "because the circulation of the support of energy is equivalent to a permanent turning out; a modulator is a continuous, temporal mold."³⁴ While molding leads to a permanent state of things, modulation introduces the factor of time: "To mold is to modulate in a definitive manner, to modulate is to mold in a continuous and perpetually

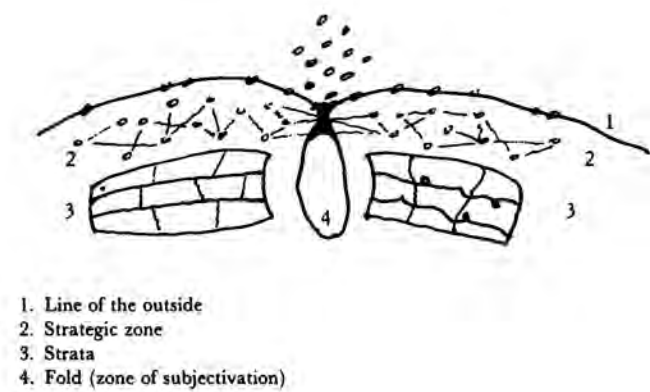
35 Simondon, *L'individu...*, ibidem; quoted in Deleuze, ibidem.

36 Gilles Deleuze, *Two regimes of Madness: Texts and Interviews 1975-1995*, trans. Ames Hodges, Mike Taormina, (Los Angeles, CA: Semiotext(e), 2006), 159.

37 Gilles Deleuze, *Two regimes of Madness, cit.*, 160.

38 See Alain Prochiantz, *Géométries du vivant*, (Paris : Fayard, 2008).

39 Gualandi, op. cit, 64-65.



“Michel Foucault’s Diagram and the Topology of the Fold”, in Gilles Deleuze, *Foucault*, trans. Seán Hand, (Minneapolis: University of Minnesota Press, 1988), 120.

40 Gilles Deleuze, *Foucault*, trans. Seán Hand, (Minneapolis: University of Minnesota Press, 1988), 34.

41 Deleuze, *Foucault*, cit., 35.

42 Anne Sauvagnargues, *Deleuze. L’empirisme transcendantal*, (Paris : Presses Universitaires de France, 2009), 422.

43 Deleuze, *Foucault*, cit., 85.

44 Ibidem, 35, not “evolution”, but *devenir*, “becoming”, in the original text.

variable manner.”³⁵ Throughout his work, Deleuze also recommends altering the idea of molding by introducing that of modulation. In 1978, for example, he affirmed: “Every direction leads us, I believe, to stop thinking in terms of substance-form.”³⁶ Taking up Simondon’s criticism of hylemorphism, opposing inert matter to active form, he proposed to substitute it with a process of modulation, in which the form-giving operation would be conceived as the coupling of forces and materials. While this theory helped Deleuze to escape from resemblance, opposing the idea that a model needs to be copied, he reached a new definition of artistic activities, as the capture of intensive forces by new materials: “The material-force couple replaces the matter-form couple.”³⁷ Contemporary science shows that genotype is not a mold that determines the individual in a univocal mode. Between the genotype and the phenotype, a process of development inserts itself, where the temporal variable plays a role as important as the spatial and topological variables.³⁸ The structure actualizes itself through a process of development, introducing factors of stochastic and temporal variability that singularize the individual prototype. As should be clear, Deleuze’s thinking was not based on vague metaphors or rhetorical tropes.³⁹ If one can speak of metaphors, it is in the noblest sense, since they were able to grasp theoretical issues even in domains that had not yet been clearly perceived by science itself.

INTENSIVE DIAGRAM

The body without organs conveys the notion of matter in a not-yet-formed state, of a body not-yet-represented, or an unrepresentable body in its schizophrenic version. Overcoming organized form, one is introduced to matter as a receptacle of forces. Beyond the matter-form opposition, beyond organized form, there is matter as a non-formal mix of forces and materials. More than a metaphor, the body without organs refers to the notion of machine and of diagram, developed, in parallel, in the work of Michel Foucault, of which Deleuze is a keen interpreter. The diagram is a map, which is coexistent with the whole society, and forms an “abstract machine.”⁴⁰ Dealing with fluxes, fluids, functions, it churns up matter, form, energy, networks. Every diagram is a “different machine.”⁴¹ Such a machine is concerned with the representation of relation of forces, belonging to a stratified formation, and it doubles the stratification (for examples, the strata of history and of society). This intensive diagram should not be conceived as a permanent structure, nor thought as a pre-existing form, but rather as a virtual problem -- that is, a complex of forces.⁴² One could define a Pastoral diagram, a Greek one, a Roman one, or a Feudal one.⁴³ Or even a Baroque diagram. The diagram, however, is not historical, but belongs to a phenomenon of becoming: “it doubles history with a sense of continual becoming (*devenir*).”⁴⁴

45 Ibidem, 86, translation edited by us.

46 Sauvagnargues, *Deleuze. L'empirisme transcendantal*, op. cit., 423.

47 Daniel Defert, "Hétérotopie: tribulations d'un concept entre Venise, Berlin et Los Angeles", in: Michel Foucault, *Le corps utopique*; suivi de *Les Hétérotopies*, postface by Daniel Defert, (Paris: Lignes, 2009), 36-61.

48 Deleuze, *Foucault*, cit., 120.

49 Ibidem, 118.

50 Ibid.

51 Ibidem, 119.

52 Ibid.

As Deleuze remarks in nearly all of his books: "There is ... a becoming of forces which remains distinct from the history of forms ... It is an outside which is farther away than any external world and even any form of exteriority."⁴⁵ Indissociable from its actualization, the diagram is used to inject some becoming in every point of the stratified reality.⁴⁶ The concept of the diagram as an abstract machine helps us to understand the biological and machine-like reality of so many strata, such as institutions, technologies, and apparatuses; including heterotopias.⁴⁷ Moreover, it can help characterize works of art, including Proust's *In Search of Lost Time*, Artaud's schizo-poetics, or Francis Bacon's exhibition of the flesh. The diagram offers the tools to map art's phyla and genus, its phylogenesis as much as its heterogenesis.

Subsequently, one reaches what Deleuze defined as "Foucault's Diagram", a sort of diagram of a diagram, if not a master diagram, divided by a line between an outside and an inside, the latter being made of strategic zones and constructed of layers or strata, in which texts and images from the past are archived. In the scheme drawn by Deleuze, there is a gigantic fold, which indicates the position of oneself in relation to the task of producing new modes of subjectification. This way, three agencies (or instances) are being held together by a fold, which acts as topological operator.⁴⁸ Outside and inside are inverted. Far and near converge. According to Deleuze, for Foucault, Descartes's, "I think, therefore I am," should be replaced by the renewed formulation, I think, therefore I fold: "The general topology of thought ... ends up in the folding of the outside into the inside."⁴⁹ The urgent prerequisite is to construct an inside-space that is completely co-present with the outside-space, "on the line of the fold."⁵⁰ Independent of distance and within the limits of any vital, lived space, "Every inside-space is topologically in contact with the outside-space . . . and this carnal or vital topology, far from showing up in space, frees a sense of time that fits the past into the inside, brings about the future in the outside, and brings the two into confrontation at the limit of the living present."⁵¹ As Deleuze states, this is how Foucault grasps the doubling, or the fold: "If the inside is constituted by the folding of the outside, between them there is a topological relation: the relation to oneself is homologous to the relation with the outside and the two are in contact, through the intermediary of the strata which are relatively external environments (and therefore relatively internal)."⁵²

It is possible to immerse oneself in an archive made of visible forms and articulate bodies; to cross surfaces, graphs, charts, and curves; and to follow fissures in order to reach an interior of the world. But at the same time it is also necessary to climb above the strata in order to reach an outside, an atmospheric element: "The informal outside is a battle, a turbulent, stormy zone where particular points and the relations of forces between these points are tossed about. Strata merely collected and

- 53 Ibidem, 121.
- 54 Ibid.
- 55 Ibid.; and not "micro-politics", as translated.
- 56 Gilles Deleuze & Félix Guattari, *What is philosophy?*, transl. Hugh Tomlinson and Graham Burchell, (New York: Columbia University Press, 1994), 164.
- 57 Deleuze & Guattari, *What is philosophy?*, op. cit., 165.
- 58 *Freiheit der Linie : von Obrist und dem Jugendstil zu Marc, Klee und Kirchner*, Erich Franz, et al., eds., (Bönen : Kettler, 2007).
- 59 Reyner Banham, "The New Brutalism", *The Architectural Review*, 118, December 1955, 354-61, quote 361. Reprinted in *A Critic Writes: Essays by Reyner Banham*, (Berkeley: University of California Press, 1996), ed. Mary Banham et al, 7-15, 14.
- 60 Gilles Deleuze, Félix Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia*, transl. Brian Massumi, (Minneapolis: University of Minnesota Press, 1987), 263.
- 61 Gilles Deleuze, Félix Guattari, *Nomadology: The War Machine*, trans. Brian Massumi, [*Traité de nomadologie*. English], (New York, NY: Semiotext(e), 1986), 53-54; *Nomadology* forms chapter 12 of : Gilles Deleuze, Félix Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia*, transl. Brian Massumi, (Minneapolis: University of Minnesota Press, 1987), 382 [trans. slightly different].

solidified the visual dust and the sonic echo of the battle raging above them.”⁵³ Nevertheless, for Deleuze, “up above, the particular features have no form and are neither bodies nor speaking persons.”⁵⁴ For both Foucault and Deleuze, the diagram is a “micro-physics.”⁵⁵ However, read by Deleuze, Foucault’s diagram lives a new life. Rising above the static opposition between form and matter, situating oneself in an energetic dimension, it becomes possible to think materiality in terms of movement and forces, and introduce a potential of deformation active in the material.

As Deleuze wrote, to have something stand up “does not mean having a top and a bottom or being upright.”⁵⁶ One can draw “a monument, but one that may be contained in a few marks or a few lines, like a poem by Emily Dickinson.”⁵⁷ Following this remark, it would be possible to attempt to write a brief history of the line, say, from William Hogarth’s “line of beauty” (1753) to Henry van de Velde’s line as a force, to Paul Klee’s inflected lines,⁵⁸ and up to the topology of splines used in 2-D/3-D modeling. Already in the 1950s, while opposing the Platonism of Colin Rowe, Reyner Banham advocated a topological architecture.⁵⁹ Suddenly, what formed the basis of the traditional categories of space sees its meaning transformed, by transmutation, into a topological contact surface.

FLUID SPACES

Today, a question remains: how have topological concepts been introduced in architecture? Perhaps, a particularly refined topology is needed to describe the formation of spirals and vortices, or nomadic, smooth spaces, which are formed by haptic relations. As Deleuze and Guattari put forward, haecceities are to be found along intersecting lines: “Climate, wind, season, hour ... Haecceity, fog, glare. A haecceity has neither beginning nor end, origin nor destination; it is always in the middle; it is not made of points, only lines. It is a rhizome.”⁶⁰ From there, the well-known distinction between a nomad, “smooth” space, as opposed to a sedentary, “striated” condition will be developed by Deleuze and Guattari: “... There is an extraordinary fine topology that relies not on points or objects, but on haecceities, on sets of relations (winds, undulations of snow or sand, the song of the sand or the creaking of ice, the tactile qualities of both); it is a tactile space, or rather ‘haptic’, a sonorous much more than a visual space. ... The variability, the polyvocality of directions, is an essential feature of smooth spaces of the rhizome type ... The nomad, nomad space, is localized and not delimited. What is both limited and limiting is striated space.”⁶¹ Deleuze, inspired as always by Simondon, revived the concept of haecceity developed in Duns Scott’s scholastic philosophy. Haecceity stems from the Latin *haecceitas*, meaning “this-ness”, from *Haec*, “this thing.”

63 Gilbert Simondon, "The Genesis of the Individual," in: Jonathan Crary & Sanford Kwinter (eds.), *Incorporations* (New York: Zone Books, 1992), 297-319. See *Gilbert Simondon: Being and Technology*, Arne De Boever, Alex Murray, Jon Roffe, Ashley Woodward, eds., (Edinburgh: Edinburgh University Press, 2012).

62 See the new edition of the main doctoral thesis (1957): Gilbert Simondon, *L'Individuation à la lumière des notions de forme et d'information*, (Grenoble: Millon, 2005), 225. This edition combines *L'Individu et sa genèse physico-biologique* (Paris: Presses universitaires de France, 1964), that Deleuze read, and *L'Individuation psychique et collective*, published in 1989.

64 Deleuze, Guattari, *Nomadology*, cit., 18 and 125; the authors cite: *Boulez on Music Today*, trans. Susan Bradshaw and Richard Rodney Bennett, (Cambridge, Mass.: Harvard University Press, 1971), 85.

65 Deleuze, Guattari, *Nomadology*, cit., 67.

66 Sauvagnargues, *Deleuze et l'art*, cit., 232-234.

67 Wilhelm Worringer, *Abstraction and empathy; a contribution to the psychology of style* [*Abstraktion und Einfühlung; ein Beitrag zur Stilpsychologie*. English. 1907], trans. Michael Bullock, (New York: International Universities Press, 1963).

70 Wilhelm Worringer, *L'Art gothique*, trans. from the German D. Decourdemanche, (Paris: Gallimard, 1941); new ed., Id., same title, (Paris: Gallimard, 1967), see in general, 61-115; and in particular, 83, 86-87.

68 *A Thousand Plateaus*, op. cit., 496.

69 Wilhelm Worringer, *Form in Gothic*, [*Formprobleme der Gotik*. English.1911], trans. Herbert Read, (London: Putnam, 1927), pref. to the 1st edition: "In its basic views the present psychological investigation of style is a sequel to my earlier book, *Abstraction and empathy*."

As it were, haecceity, or individuation, helped to explain the existence of particular individuals. With Scott, such a conception opposed to the Aristotelian theory of *hylomorphism*, which held that any individual being was the creation of dynamic form applied on indistinct matter, as if nature's creations were the outcome of a sculptor molding clay. Derived from the Greek, hylomorphism (or hylomorphism) referred to the imposition of an active form (*morphe*) onto passive matter (*hyle*). Scott refuted this theory, rejecting the suggestion that determinate, individual beings could be the output of indeterminate matter. As previously mentioned, Simondon will criticize hylomorphism for its universalistic, static, and frozen approach, and instead define individuation as an ongoing process that consists precisely of a modulation between form and information.⁶² For both Simondon and Deleuze, one should consider carefully the specific processes of becoming-individual, encompassing the singularity in each being.⁶³

For Deleuze, haecceity is not limited to any question of scale (small or large), but has a peculiar consistency which connects it physically to phenomenon, such as vapor, haze, mist or cloud situations that blur any defined limit or border. Haecceity constellates, forming groups, clusters and flocks. Inspired by Pierre Boulez's theory of music, Deleuze and Guattari write: "the model is a vortical one; it operates in an open space throughout which things-flows are distributed, rather than plotting out closed space for linear and solid things. It is the difference between a *smooth* (vectorial, projective or topological) space and a *striated* (metric) space."⁶⁴ In the first case, space is occupied without being measured, while in the second space is measured in order to be occupied, a distinction taken from Boulez. Like a flock, smooth, "nomad" art circulates in an open and connected space, as opposed to a striated, geometrical art, centered and self-contained. It is actually two different usages of measure: smooth space relies on a "numbering number [which] is rhythmic, not harmonic. It is not related to cadence or [an external] measure,"⁶⁵ while striated space is based on a homogeneous measure, marking out the surface in squares and rearranging everything in order. This observation helps tell apart an abstract line, unfolding its smooth space from a set of twists and torsions -- that is, from a striated space subject to norms and orthogonally squared by rules.⁶⁶

Deleuze had read Wilhelm Worringer's *Abstraction and Empathy* (1907).⁶⁷ He was convinced that Worringer had given fundamental prominence to the abstract or primitivistic line "seeing it as the very beginning of art or the first expression of artistic will. Art as abstract machine."⁶⁸ Pursuing the investigation, Worringer published *Form in Gothic* (1911),⁶⁹ a psychological investigation of style, presented by him as a sequel to *Abstraction and Empathy*. Deleuze read also *Form in Gothic* and repeatedly quoted it from the French translations:⁷⁰ "From the depths of time there comes to us what Worringer called the abstract and infinite northern line,

- 71 Wilhelm Worringer, *Form in Gothic*, op. cit., 41-42; quoted in: Deleuze & Guattari, *What is philosophy?*, op. cit., 182.

- 72 Deleuze, *Francis Bacon ...*, op. cit., 40-41.

- 73 Sauvagnargues, *Deleuze et l'art*, cit., 234.

- 74 Gilles Deleuze, *The Fold: Leibniz and the Baroque*, trans. Tom Conley, (Minneapolis: University of Minnesota Press, 1993), 14.

the line of the universe that forms ribbons, strips, wheels, and turbines, an entire ‘vitalized geometry,’ *rising to the intuition of mechanical forces*, constituting a powerful nonorganic life.”⁷¹ What differentiates the nomadic line from classical ornamentation are the paradigms of speed, of proliferation, and of accelerated transformation, which all are characteristics of smooth space. In such a space, the line is free from representational purposes, as well as untied from the laws of metrics; as such, it is liberated from classical symmetry, from the repetition of the motif, and from the striations of rational coordinates. All these characteristics belong to Renaissance architecture, which make it a stable, classical and “organic” art.

Following Worringer, Deleuze reveals definitively an anticlassical bend, and shows a preference for the northern line that swells by indefinite iteration. Moved by a principle of internal proliferation, the line follows the model of fluids, not solids: “The pictorial line in Gothic painting is completely different, as is its geometry and figure. First of all, this line is decorative; it lies at the surface, but it is a material decoration that does not outline a form. It is a geometry ... in the service of ‘problems’ or ‘accidents,’ ablation, adjunction, projection, intersection. It is thus a line that never ceases to change direction, that is broken, split, diverted, turned in on itself, coiled up, or even extended beyond its natural limits, dying away in a ‘disordered convulsion’”⁷² Potently “inorganic”, the line is set in motion by a mechanical mobility, whose redundancy and potent vitality is to be found in barbaric arts up to the Gothic. Worringer’s book described so accurately the Gothic line of non-organic life that the infinite melody of the northern line offered a precise basis for Deleuze’s kinetic line.⁷³ From *A Thousand Plateaus* and *The Logic of Sensation*, to *What is philosophy?*, the boreal-northern line will be used by Deleuze (and Guattari) to frame problems, for example, the organic and the non-organic, and also to map theoretical issues such as the smooth and the striated spaces, the nomad and the sedentary, and so forth. In Deleuze’s *The Fold*, mutating itself into a baroque feature, the nomadic line will be defined as the becoming-line of the point, which unfolds in a trajectory.⁷⁴ As an outcome, nomadic lines take on great vortical organizations, prop up smooth topological spaces, and allow for a speed of proliferation that expands beyond the frame. The aim of art is to divert force into matter. What sets apart the nomadic line, whether from the northern-gothic variety or from the baroque type, is that it embodies speed and fluidity, while it captures intense forces in new materials.

What are the consequences for today’s architecture? At present, through customized informational engines, it seems imperative to incorporate intensive elements into the virtual building. Such an experimental approach

76 Kristina Shea, "Directed Randomness", in *Digital Tectonics*, Neil Leech, David Turnbull, Chris Williams, eds., (Chichester, U.K.; Hoboken, N.J., Wiley-Academy, 2004), 89-101; Judith Leuppi and Kristina Shea, "The Hylomorphic Project", in *The ARUP Journal*, January issue, London, 2008, pp. 28-30.

78 Georges Teyssot, *Une topologie du quotidien*, (Lausanne, CH: PPUR, Presses polytechniques et universitaires romandes, 2016), pp. 53-69.

75 Panagiotis Michalatos and Sawako Kaijima, "Intuitive Material Distribution", in *Mathematics of Space. AD Architectural Design*, George L Legendre, ed., Volume 81, Number 4, Wiley, 2011, p.69.

77 Samuel Bernier-Lavigne, "Modulation de l'objet. Corrélation numérique entre force, forme et matière", in *SCAN'16 Toulouse, Séminaire de conception architecturale numérique : Mètre et paramètre, mesure et démesure du projet*, s.l.d. Jean-Pierre Goulette et Bernard Ferries, PUN – Éditions Universitaires de Lorraine, Toulouse, 2016, pp.249-263.

aims at defining design solutions in response to a wide range of structural and environmental parameters. During the process, elements of structural engineering, such as distribution of stresses and the entire load bearing data, are taken into account, according to fitness criteria, prior to being selected by the designer in terms of their aesthetic aptness. Current specific digital technologies, such as topological optimization software, are based on weight and material efficiency model, generated through an iterative process.⁷⁵ Once a base condition is established, the software runs multiple iterations and then analyzes them to determine a best solution. The initial design is based on given parameters, and then is computed by the application, allowing an optimized solution to be determined.⁷⁶ Such a mode offers the possibility to integrate the expertise of designers and engineers on a unique computational platform. Information, which determines the formal concretization of architecture, is scripted to negotiate between form and matter, or, more precisely, between forces and materials. Such scripted procedures are akin to Simondon's "modulation".⁷⁷ If evolved architectural structures are to enjoy the same degree of combinatorial productivity as biological ones, they must be initialized by an adequate diagram, as an "abstract" or virtual building*.⁷⁸ At this point, the design departs from the conventional practices, engaging a complex of forces of which one must trace the diagrams, whether energetic, systemic, or topological.