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## Spatial Relations between Conscious and Unconscious Thought

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# Spatial Relations between Conscious and Unconscious Thought

John Shannon Hendrix

With reference to: Anca Carrington, *The Unconscious as Space: From Freud to Lacan, and Beyond*, London and New York: Routledge, 2024.

Anca Carrington makes the argument that the unknowable unconscious must involve a fourth dimension, an element beyond the three dimensions of conscious perception. She argues that Jacques Lacan's explorations of mathematics and topological geometry as structures of the unconscious that reveal the presence of the Real, what is beyond knowledge, lead to the necessity of a fourth dimension, although she concedes that Lacan "remains rather dismissive of the idea of a fourth dimension,"<sup>1</sup> and "recognises the limitations of representation of higher-dimensional objects in lower dimensions," as expressed in *L'identification: Séminaire IX, 1961–1962* (268).<sup>2</sup> As Freud said, the unknown part of the mind is the same as the unknown part of the universe. It stands to reason that the reality beyond what we perceive in the universe (it is generally accepted by physicists that there is such a reality, for example Stephen Hawking and Roger Penrose, in *The Nature of Space and Time*: "what we experience as 'physical reality' may actually be some kind of boundary of a higher-dimensional structure")<sup>3</sup> corresponds to the reality of the human mind beyond understanding in rational and conscious thought.

The fourth dimension is any dimension, or mathematical description of size or location, beyond the ordinary space or Euclidean space of perception in three dimensions. The most common fourth dimension involves time. Albert Einstein's concept of spacetime in the theory of relativity involved three spatial dimensions and one temporal dimension. In 1827, August Ferdinand Möbius conceived of a fourth dimension by rotating a three-dimensional form onto its mirror image, thus becoming enantiomorphous. The Möbius strip, which would play a key role in Lacan's topological understanding of the unconscious, is an abstract topological surface that can be embedded into three-dimensional Euclidean space, thus placing the topology of the unconscious in a space between the known and unknown. The Möbius strip can be seen as a circle of the zodiac being held by Aion, Hellenistic god of cyclical time and the zodiac, contrasting the linear time of Chronos, in a mosaic from the town of Sentinum in the Marche region in third-century Rome (Figure 1). Here the band may have been twisted just to show all of the zodiac signs along it.



Figure 1.

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<sup>1</sup> Anca Carrington, *The Unconscious as Space: From Freud to Lacan, and Beyond* (London and New York: Routledge, 2024), p. 137.

<sup>2</sup> Jacques Lacan, *L'identification: Séminaire 1961–1962* (Paris: Éditions de l'Association Lacanienne Internationale, hors commerce, 2020).

<sup>3</sup> Stephen Hawking and Roger Penrose, *The Nature of Space and Time* (Oxford: Princeton University Press, 1966, p. 141), quoted in Carrington, *The Unconscious as Space*, p. 149.

It cannot be denied that the psychoanalytic concept of the unconscious involves a spatial component, since Freud's reinvention of the unconscious. As Freud said, "Space may be the projection of the extension of the psychic apparatus. No other derivation is probable. Instead of Kant's *a priori* determinants of our psychical apparatus, Psyche is extended; knows nothing about it (*Psyche ist ausgedehnt; weiss nichts davon*)."<sup>4</sup> Freud conceived the unconscious in spatial terms. Rather than seeing space as an *a priori* intuition, Freud sees space as an extension of the unconscious mind, of which the conscious mind is unaware. Conversely, the unconscious is space itself, is structured spatially, and must be understood in terms of spatial relations.

The Freudian concept of the psyche, in its spatial quality, can be best summarized as his two "topographies." The first topography, as described in *The Unconscious* (SE 14) in 1915, involved the realms of the unconscious (*Ucs*), preconscious (*Pcs*), and conscious (*CS*). The second topography, as described in *The Ego and the Id* (SE 19) in 1923, involved the realms of the id (*Es*), ego (*Ich*), and superego (*Über-Ich*). Earlier, Freud wrote, in *The Interpretation of Dreams* in 1900,

Accordingly, we will picture the mental apparatus as a compound instrument, to the components of which we will give the name of 'agencies', or (for the sake of greater clarity) 'systems'. It is to be anticipated, in the next place, that these systems may perhaps stand in a regular spatial relation to one another, in the same kind of way in which the various systems of lenses in a telescope are arranged behind one another. Strictly speaking, there is no need for the hypothesis that the psychical systems are actually arranged in a *spatial* order. It would be sufficient if a fixed order were established by the fact that in a given psychical process the excitation passes through the systems in a particular *temporal* sequence.<sup>5</sup>

In a diagram (Figure 2), Freud showed the psychical process of excitation to be both spatial and temporal. The psychical process begins with conscious perception receiving perceptual stimuli, which then leave mnemonic residues or memory traces in the unconscious, which can be accessed again by conscious thought through the preconscious. Conscious thoughts are given to the subject by perception. In *An Outline of Psycho-Analysis* in 1938, Freud wrote "the process of something becoming conscious is above all linked with the perceptions which our sense organs receive from the external world."<sup>6</sup> This is a quality of the Imaginary of Lacan, as occurs in the mirror stage. The consciousness of the infant to itself is given by perception; consciousness is a construct, as is reason, of perception. But Freud continues, "there is an added complication through which internal processes in the ego may also acquire the quality of consciousness. This is the work of the function of speech, which brings material in the ego into a firm connection with mnemonic residues of visual, but more particularly of auditory, perceptions" (34–5). Consciousness occurs through both thought and perception, and Freud calls the device which distinguishes between the two "reality-testing." Such a device is intended to distinguish between actual perception and dreams, fantasies and hallucinations, but the distinctions are not always readily apparent.

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<sup>4</sup> Sigmund Freud, SE 23: "Findings, Ideas, Problems," in *The Standard Edition of the Complete Psychological Works of Sigmund Freud*, trans. James Strachey (London, 1938), p. 300.

<sup>5</sup> Sigmund Freud, *The Interpretation of Dreams*, trans. James Strachey (New York: Avon Books, 1965; SE 4–5, London: The Hogarth Press and the Institute of Psychoanalysis, 1953), p. 575.

<sup>6</sup> Sigmund Freud, *An Outline of Psycho-Analysis, The Standard Edition*, trans. and ed. James Strachey (New York: W. W. Norton, 1949), p. 34.

The goal of psychoanalysis, for Freud, is to fill in those gaps in consciousness in order to have access to unconscious processes. Gaps describe a spatial condition. In *An Outline of Psycho-Analysis*, “we have discovered technical methods of filling up the gaps in the phenomena of our consciousness, and we make use of those methods just as a physicist makes use of experiment. In this manner we infer a number of processes which are in themselves ‘unknowable’ and interpolate them in those that are conscious to us” (83). As for Lacan, the unconscious is inaccessible, and can only be known in absence, in the gaps in consciousness. The gaps in the phenomena of consciousness can be seen as the holes and scotomata of Lacan, as described in “Aggressivity in psychoanalysis” in *Écrits: A Selection*: “everything that the ego neglects, scotomizes, misconstrues in the sensations that make it react to reality, everything that it ignores, exhausts, and binds in the significations that it receives from language.”<sup>7</sup>

It was Freud’s failure, according to Lacan, that he did not recognize the holes and scotomata in reason itself, in the perception-consciousness system, as it is given by language, as opposed to consciousness alone, given its connection with language and perception. The concept of the unconscious is the same for both Freud and Lacan, though, as that which is unknowable, and revealed in absence, and the science of discovering the principles of the unconscious is the same for Freud as any other science, the subject of which is reality, which “will always remain ‘unknowable,’” but which is reconstructed through scientific hypothesis. As in psychoanalysis, “the yield brought to life in scientific work from our primary sense perceptions will consist in an insight into connections and dependent relations which are present in the external world,” which can be “reliably produced or reflected in the internal world of our thought and a knowledge of which enables us to ‘understand’ something in the external world, to foresee it and possibly to alter it” (*An Outline of Psycho-Analysis*, 83). As for Lacan, there is a primordial disjunction between reason and that which is perceived, and it is that disjunction which becomes the basis of exploration in Lacanian

psychoanalysis, through the methodology of the science of the letter, as formulated in the dialectic of the Imaginary and Symbolic in a spatial relationship.

For Freud, “the data of conscious self-perception, which alone were at its disposal, have proved in every respect inadequate to fathom the profusion and complexity of the processes of the mind, to reveal their interconnections and so to recognize the determinants of their disturbances” (82). Lacan’s project was to widen the framework of conscious self-perception as much as possible, through the study

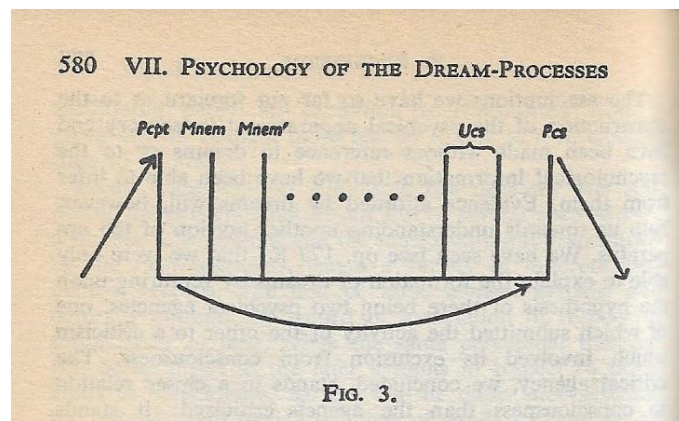


Figure 2.

of the functions of language as the mechanism of conscious self-perception itself, thus revealing the limitations of the framework at the same time, and of understanding unconscious processes through those very limitations. Freud continued, “in our science as in the others the problem is the same: behind the attributes (qualities) of the object under examination which are presented directly to our perception, we have to discover something else which is more independent of the particular

<sup>7</sup> Jacques Lacan, *Écrits, A Selection*, trans. Alan Sheridan (New York: W. W. Norton, 1977), p. 22.

receptive capacity of our sense organs and which approximates more closely to what may be supposed to be the real state of affairs.”

Lacan’s revision of this position in psychoanalysis is that, despite the disjunction between reason and that which is perceived, which is maintained by Lacan, that “something else” which we discover, independent of sense perception, is equally deceptive, because it is given by conscious reason, which is a product of perception in relation to language, and it is very limited in its ability to approximate a real state of affairs. The real state of affairs in psychoanalysis is found in between reason and reality, in the interaction between the two, and in between perception and consciousness in the diagram of Freud, in which is revealed the possibility of the unconscious. That which is in between perception and consciousness is that which defines and differentiates the Imaginary and the Symbolic of Lacan.

In *The Ego and the Id*, Freud differentiated an unconscious idea or thought from a preconscious idea or thought in that the latter is “brought into connection with word-presentations,”<sup>8</sup> that is, language. The word-presentations are described as residues of memories of auditory perceptions, as indicated in the diagram. This leads Freud to the conclusion that only a thought which begins as a mnemonic residue of a perception can resurface to consciousness from the preconscious, and that any thought arising from within the unconscious must be transformed into an external perception, through the memory-trace, in order to become conscious. This is a conception which is determinately overturned by Lacan, in particular in his definition of the unconscious as the discourse of the Other, the Symbolic order, and that it is already structured like a language. In Lacan, there is no distinction between thought and language, because the signified has been shown to be inaccessible to the signifier, except as in absence. Within language, Lacan adopted the distinction between *parole*, signifier or spoken word, and *la langue*, signified or underlying structural complex of language, from the structural linguistics of Ferdinand de Saussure. Lacan transformed *la langue* into *lalangue*, making it less structuralist, and more connected to *jouissance* or pleasure.

The possibility of unconscious thought in spatial terms can be found in the structural linguistics of Saussure, in the concept of the “floating kingdoms” (Figure 3), where thought is seen as “a vague, uncharted nebula”<sup>9</sup> independent of language, in the *Course in General Linguistics*. Language is seen as giving sound and order to unconscious thought, as language is pictured in its totality as “a series of contiguous subdivisions marked off on both the indefinite plane of jumbled ideas and the equally vague plane of sounds,” which constitute the signified and the signifier, and the intersection of which is described as arbitrary. The “thought-sound” division of language suggests the presence of unconscious thought. Such a concept is close to the Lacanian concept of the linguistic structuring of the unconscious as the discourse of the Symbolic, which is itself a matrix of rules.

Freud is close to Saussure in concluding from dream analysis that “what becomes conscious in it [visual thinking] is as a rule only the concrete subject-matter of thought, and... the relations between the various elements of this subject-matter, which is what specially characterizes thoughts, can not be given visual expression” (*The Ego and the Id*, 14). This corresponds to the

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<sup>8</sup> Sigmund Freud, *The Ego and the Id*, *The Standard Edition*, trans. Joan Riviere, ed. James Strachey (New York: W. W. Norton, 1960), p. 12.

<sup>9</sup> Ferdinand de Saussure, *Course in General Linguistics*, trans. Wade Baskin (New York: McGraw-Hill, 1966 [1915]), p. 112.

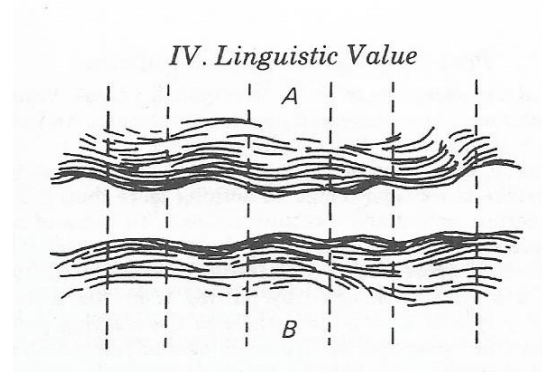


Figure 3.

Freud saw language as that which transforms unconscious thought into perception. “The part played by word-presentations now becomes perfectly clear. By their interposition internal thought-processes are made into perceptions” (16). The mirror stage of Lacan shows that there are no internal thought-processes prior to perception, that perception is the result of the intersection of language and Imaginary image identification, and that the thought-processes of the Imaginary are then retroactively created by the intersection of language and perception. For Freud, in the hypercathexis of the process of thinking, thoughts are perceived “as if they came from without.” Freud defined ego as a product of perception, as did Lacan.

In *The Unconscious as Space*, Carrington makes the interesting observation that Freud’s diagram in *The Interpretation of Dreams* can be seen as a form of a Möbius strip. “What Freud did not have at the time were the means to conceptualize the fact that he was depicting the relative positions of the agencies of the psyche as a continuous space with a twist, which makes his diagram equivalent to a Möbius band in fundamental polygon representation with directed edges” (15), the fourth dimension inserted into three-dimensional space. Lacan would use the Möbius band to illustrate the topological structure of the unconscious and the lack of distinction between internal and external, combining the two in *extimité*. The topological structure of the Lacanian unconscious is the subject of the research of Don Kunze, who explores models such as the torus, Möbius band, and Klein bottle, and figures such as Pappus of Alexandria (the calculation of the volume of the torus), Girard Desargues, Möbius, Leonhard Euler (Euler’s circle and the Königsberg bridge problem), and Felix Klein (the Klein bottle, combining two Möbius strips) as influencing Lacan. This research can be found in particular in two essays, “Concentricity of Laws of Form” and “Theorizing Beyond Joan Copjec’s ‘The Strut of Vision’” which are included in the volume *Lacan + Architecture*, edited by myself and Francesco Proto, published by Palgrave MacMillan in September, 2024. Kunze also explores the Borromean knot, the Brunnian link, and the Venn diagram in the work of Lacan. Elisabeth Roudinesco, in her biography of Lacan, described Lacan’s collaboration with the mathematician Georges-Théodule Guilbaud to develop these models as they can be applied to psychoanalysis.<sup>10</sup> Lacan used topological models to help explain Freudian neuroses and psychic processes such as transference, condensation, displacement, and mourning, as explained by Virginia Blum and Anna Secor in their essay “Psycho-topologies: Closing the Circuit between

underlying nebula of thoughts of Saussure which are only given concrete existence in a direct correspondence with a word in language, in the relation between signified and signifier. Freud concluded that “thinking in pictures is, therefore, only a very incomplete form of becoming conscious,” because mnemonic images, whether in language or dream memories, cannot correspond completely to the underlying structures in the unconscious from which they are derived, because of the possibility of unconscious thought.

<sup>10</sup> Elisabeth Roudinesco, *Jacques Lacan*, trans. Barbara Bray (New York: Columbia University Press, 1997), p. 363.



Psychic and Material Space.”<sup>11</sup> As Lacan wrote, “a topology, in the mathematical sense of the term, appears, without which one soon realizes that it is impossible to even note the structure of a symptom in the analytic sense of the term.”<sup>12</sup> According to Anca Carrington, “Blum and Secor propose the term ‘psychotopology’ in order to capture the ways in which ‘material and psychic spaces are inseparable from one another’” (*The Unconscious as Space*, 109, quoting Blum and Secor, 1031). Topology corresponds to a structural approach to mathematics, which corresponds to Lacan’s structural view of the unconscious. In his linguistics, Lacan focuses entirely on the signifier, and mathematics as a pure system of signifiers. As Lacan said in *Seminar III*, “[M]athematics [...] uses language as pure signifier, a metalanguage par excellence.”<sup>13</sup>

In a diagram by Freud mapping his second topography (Figure 4), which appeared in *The Ego and the Id* in 1923, perception and consciousness are joined together, but divided at the same time, consistent with a Möbius band. The boundaries between perception and consciousness, conscious and unconscious, the ego and the id are blurred. “The ego is not sharply separated from the id; its lower portion merges into it.... It is easy to see that the ego is that part of the id which has been modified by the direct influence of the external world through the medium of the *Pcpt.-Cs.*; in a sense it is an extension of the surface-differentiation. Moreover, the ego seeks to bring the influence of the external world to bear upon the id and its tendencies, and endeavors to substitute the reality principle for the pleasure principle which reigns unrestrictedly in the id,” Freud wrote (18–19). “Where id was, there ego shall be” (*Wo Es war, soll Ich werden*, Lacan wrote, quoting Freud).<sup>14</sup>

It has been observed that Freud shifted from representational pictures to abstract diagrams, fitting in with scientific practice in Germany. Mark Solms interpreted the shift as paralleling Freud’s transition from neuropsychology to metapsychology.<sup>15</sup> Freud was in the process of abandoning traditional methods of neuroscience based on clinical observation, because many of the

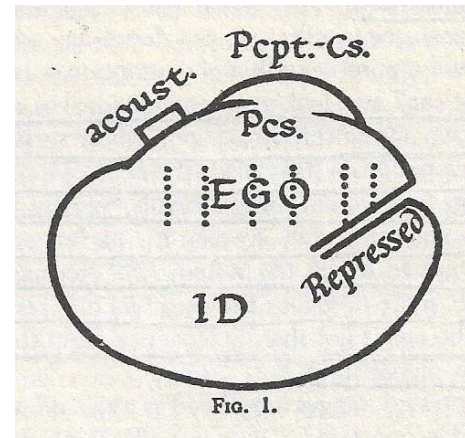


Figure 4.

<sup>11</sup> Virginia Blum and Anna Secor, “Psycho-topologies: Closing the Circuit between Psychic and Material Space,” in *Environment and Planning D: Society and Space* 29(6), 2011, pp. 1030–47. See Jane Rendell, “X Marks the Spot that Will Have Been,” in *Architecture and the Unconscious*, ed. John Shannon Hendrix and Lorens Eyan Holm (London: Routledge, 2016), pp. 155–6.

<sup>12</sup> Jacques Lacan, “The significance of the phallus,” in *Écrits*, trans. Bruce Fink (London: W. W. Norton, 1958), p. 578, quoted in Carrington, p. 23.

<sup>13</sup> Jacques Lacan, *Seminar III: The Psychoses 1955–1956*, trans. Russell Grigg (London: W. W. Norton, 1997), p. 227. Quoted in Carrington, p. 23.

<sup>14</sup> Jacques Lacan, *Seminar VII, The Ethics of Psychoanalysis 1959–1960*, trans. Dennis Porter (New York and London: W. W. Norton, 1992), p. 7: “The moral experience involved in psychoanalysis is the one that is summed up in the original imperative proposed in what might be called the Freudian ascetic experience, namely, that *Wo Es war, soll Ich werden* with which Freud concludes the second part of his *Vorlesungen (Introductory Lectures)* on psychoanalysis.”

<sup>15</sup> Mark Solms, “Sigmund Freud’s Drawings,” in Lynn Gamwell and Mark Solms, *From Neurology to Psychoanalysis: Sigmund Freud’s Neurological Drawings and Diagrams of the Mind* (New York: Binghamton University Art Museum and State University of New York Press, 2006), p. 16. See Jane Rendell, “X Marks the Spot that Will Have Been,” p. 153.

psychic phenomena that he was observing could not be connected to physical causes. About such a diagram, Freud wrote in *The New Introductory Lectures on Psychoanalysis* of “areas of color melting into one another as they are presented by modern artists. After making the separation we must allow what we have separated to merge together once more.”<sup>16</sup> The Freudian ego is connected to the body, like Lacan’s Imaginary ego, and has a surface-like quality. In *The Ego and the Id*, Freud wrote that the ego is “the projection of a surface,” and “is derived from bodily sensations, chiefly those springing from the surface of the body. It may thus be regarded as a mental projection of the surface of the body, besides [...] representing the superficialities of the mental apparatus.”<sup>17</sup> The body is a key point of reference in terms of the spatial orientation of the subject in relation to external physical objects. The connection of the body to the environment suggests the *Taetraum*, a haptic space of immediate bodily sensations, as suggested in the *Philosophy of Symbolic Forms* of Ernst Cassirer, or Ernst Mach’s treatise of 1914, *The Analysis of Sensations and the Relation of the Physical to the Psychical*. The *Taetraum* can be compared to the psychophysiological space described by Erwin Panofsky in “Perspective as Symbolic Form”<sup>18</sup> in 1924, which can be compared to the dream space of Freud. In psychophysiological space, color surfaces are juxtaposed (154) in a pictorial space, like dream space, filled with fluctuation and transparency, the simultaneous perception of different spatial locations, the interweaving of reciprocal relations, condensed and fragmented forms. Condensation and displacement are spatial movements in the psyche that are not possible in perceived space.

Images in dreams present themselves differently from images in perception, not connected to the object identifications of sensible forms. In *The Interpretation of Dreams*, Freud described dream images as competing in intensity and superimposition (359), and color impressions are given hallucinatory clarity in relation to the mnemonic residues, the dream images corresponding to the dream thoughts, or the signifiers (586).<sup>19</sup> In Freud’s *On Dreams*, dreams are described as “disconnected fragments of visual images” (40).<sup>20</sup> Dream images do not appear in relation to the insertion by the subject of itself into the field; they are independent of the interaction between a representation of the subject and the *Vorstellungsrepräsentanzen*, the ideational representations in thought, the representations of mnemonic residues, the thing presentation (*Sachvorstellung*) combined with the word presentation (*Vortvorstellung*), though the object identifications of the subject are present in the dream. The dream is not a product of perception, organized in relation to the subject. Seeing in perception is impossible in the dream. The subject will never “be able to apprehend himself in the dream in the way in which, in the Cartesian *cogito*, he apprehends himself as thought,”<sup>21</sup> according to Lacan.

Anca Carrington suggests that dreams have the quality of four dimensions (82), which explains why images in dreams don’t correspond to images as they are perceived in three-dimensional space. Condensation could be seen as a product of a projection from a higher to lower

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<sup>16</sup> Sigmund Freud, *New Introductory Lectures on Psychoanalysis*, SE 22, 1933, p. 79, quoted in Carrington, p. 16.

<sup>17</sup> Sigmund Freud, *The Ego and the Id*, SE 19, trans. James Strachey (London, 1923), p. 26 and in an editorial note, quoted in Carrington, p. 25.

<sup>18</sup> Erwin Panofsky, *Perspective as Symbolic Form*, trans. Christopher S. Wood (New York: Zone Books, 1991).

<sup>19</sup> Sigmund Freud, *The Interpretation of Dreams*, trans. James Strachey (New York: Avon Books, 1965).

<sup>20</sup> Sigmund Freud, *On Dreams*, ed. and trans. James Strachey (New York: W. W. Norton, 1952).

<sup>21</sup> Jacques Lacan, *Seminar XI: The Four Fundamental Concepts of Psycho-Analysis*, trans. Alan Sheridan (New York: W. W. Norton, 1977), p. 75.



dimension (88). Juxtaposed elements in four-dimensional space would appear as overlapping in three-dimensional space. The proximity of dream images that is not found in waking life suggests the possibility of a fourth dimension in the unconscious, of which we are not aware (158). The displacement which occurs in dreams is responsible for distorting, more than anything else, the “psychical intensity” of the thoughts or mnemonic residues which correspond to the dreams, according to Freud. The psychic intensity is described as the significance or “affective potentiality” (*On Dreams*, 34) of the thought or perceptual trace; the system of differences between the traces is a system of intensities as much as a system of signifiers, or more, because of the nature of the relation between the mnemonic residue and perception; some images or words are perceived at a different level of intensity than others, more clearly or more loudly, etc., and it stands to reason that the variations in intensities would be translated in the composition of the dream images, and that those variations would be illegible in relation to any conceptual structure. “In the course of this process... the psychical intensity, significance or affective potentiality of the thoughts is, as we further find, transformed into sensory vividness,” in a psychic space. The space is described by Lacan as “an immense display, a special spectre, situated between perception and consciousness” (*The Four Fundamental Concepts of Psycho-Analysis*, 45, quoted by Carrington). It is an optical model which “represents a number of layers, permeable to something analogous to light whose refraction changes from layer to layer,” as suggested in the image by Cindy Sherman, *Untitled #176 (Disaster Series)*, from 1987 (Figure 5).

As a result of the complex network of psychical relationships which produce the dream images, and the mechanisms of condensation and displacement, dreams are composed of “disconnected fragments of visual images, speeches and even bits of unmodified thoughts,” which “stand in the most manifold logical relations to one another” which are seen for example as “foreground and background, conditions, digressions and illustrations, chains of evidence and counterarguments” (40). The network of logical relations which contribute to the composition of dream images is far too complex to be unraveled in dream analysis. Displacement, condensation, fragmentation, substitution and the *coincidentia oppositorum* are products of the complex network of logical relations, or the mnemonic residues of such, in dream thoughts, which is too complex to correspond to any logical structure. In the process of the dream formation “the logical links which have hitherto held the psychical material together are lost” (41). It is the task of analysis to restore the logical connections which the dream work has destroyed, as dreams are seen as the “royal road to a knowledge of the unconscious activities of the mind” (*The Interpretation of Dreams*, 647), an access to psychical mechanisms which psychoanalysis seeks to understand. Lacanian psychoanalysis furthers this quest in the analysis of the linguistic mechanisms of which dreams are a product. The topological structure of the unconscious is transcribed in dreams, according to Carrington (159).

Freud gives as an example of correspondences between images (*Sachvorstellungen*) and linguistic structures (*Vortvorstellungen*) the frequent occurrence of houses and parts of houses in dreams. The house is seen in dream interpretation to be a symbol of the body, as a fortress might be a symbol of the ego. But Freud also observes the correspondence between the occurrence of the house in the dream and the use of the house in tropic language, in metaphorical and metonymical figures of speech in the German language. “But the same symbolism is found in our linguistic usage—when we greet an acquaintance familiarly as an ‘*altes Haus*’ [‘old house’], when we speak of giving someone ‘*eins aufs Dach!*’ [a knock on the head, literally, ‘one on the roof’], or when

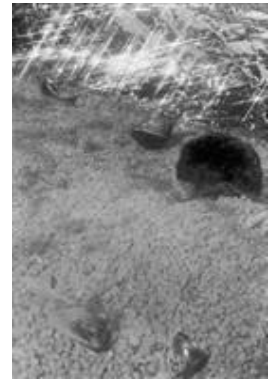


Figure 5.

we say of someone else that ‘he’s not quite right in the upper storey’. In anatomy the orifices of the body are in so many words termed ‘*Leibesportfen*’ [literally, ‘portals of the body’]” (*Introductory Lectures on Psycho-Analysis*, 196).<sup>22</sup>

It is clear that the mechanisms of metaphor and metonymy, crucial in the access to the unconscious for Lacan, are in operation visually in dreams, as transpositions from mnemonic residues of auditory perceptions to visual images. The obverse would be the case as well, that relationships between the mnemonic residues of visual images are transposed into auditory images in dreams, which gives an indication of the complexity of the underlying linguistic matrix which connects dreams with conscious thought, and which connects the unconscious with the conscious. The linguistic structures themselves must be subject to condensation, displacement and distortion, which makes their presence even more obscure. Condensation occurs in language use in slips of the tongue, for example, in which neologisms are created which display an unintentional repression, which reveals the presence of the unconscious in language. An example is “the young man who offered to ‘*begleitdigen*’ [‘*begleiten* (accompany)’ + ‘*beleidigen* (insult)’] a lady” (212). The same mechanisms occur in dream images, as they are transposed from mnemonic residues of auditory perceptions, and they are combined and interwoven with straightforward transpositions of linguistic structures, rendering them virtually impossible to translate. In addition, “a manifest element may correspond simultaneously to several latent ones, and, contrariwise, a latent element may play a part in several manifest ones—there is, as it were, a criss-cross relationship” (213), a Möbius band. As a result an attempted translation of a dream can never be literal nor follow a fixed set of rules.

The Freudian unconscious represents for Jacques Derrida in *Writing and Difference* the “irreducibility of the ‘effect of deferral’...” (203),<sup>23</sup> the absence of presence. The conscious text, the interpretation of the dream, for example, cannot be a transcription, “because there is no text present elsewhere as an unconscious one to be transposed or transported” (211). There is no discourse in the unconscious, no communication, nor in dreams, which can be translated into a conscious discourse in language. “There is no unconscious truth to be rediscovered by virtue of having been written elsewhere. There is no text written and present elsewhere which would then be subjected, without being changed in the process, to an operation and a temporalization (the latter belonging to consciousness if we follow Freud literally) which would be external to it, floating on its surface.” The dream could not be a hieroglyph, as Freud suggests in *The Interpretation of Dreams* (377) for example, because the signs do not contain a discourse. The unconscious does not exist, except as a presence of absence, an absence within presence. Thus for Derrida “the unconscious text is already a weave of pure traces, differences in which meaning and force are united—a text nowhere present, consisting of archives which are *always already* transcriptions” (*Writing and Difference*, 211).

This can be seen, as has been shown, in the structure of dreams: a complex matrix of mnemonic residues, structured like a language, but with no intention of communication, and free of the restrictions of language in conscious discourse. As the primary mechanisms of dream construction are condensation and displacement, corresponding to the mechanisms of metaphor and metonymy in the anticipation of the subject in the signifying chain, “signified presence” in both conscious and unconscious thought “is always reconstituted by deferral, *nachträglich*, belatedly,

<sup>22</sup> Sigmund Freud, *Introductory Lectures on Psychoanalysis*, trans. James Strachey (New York and London: W. W. Norton, 1966).

<sup>23</sup> Jacques Derrida, *Writing and Difference*, trans. Alan Bass (Chicago: University of Chicago Press, 1978).

*supplementarily*: for the *nachträglich* also means *supplementary*. The call of the supplement is primary, here, and it hollows out that which will be reconstituted by deferral as the present. The supplement, which seems to be added as a plenitude to a plenitude, is equally that which compensates for a lack (*qui supplée*)” (211–12). The supplement is tropic language, in the linguistics of Lacan, as that which reveals the unconscious, the lack which is being supplemented, the absence which is being made present. The signifier represents the subject to another signifier, and desire is instituted in the signifying chain, as a function of the supplement, a function of the lack in being. The mnemonic residues of perception which constitute the content of dreams, and which can be seen as revealing the presence of the unconscious in conscious thought, can be compared to the “trace” which Derrida describes as a component of language in *différance*. In *Positions*, *différance* is defined as the systematic play of traces of differences and of the spacing by which signifiers relate to one another. Spacing is the production of “intervals without which the ‘full’ terms could not signify, could not function.”<sup>24</sup> *Différance* is thus the mechanism of the production of differences in signification in the absence of a direct relationship between signifier and signified, in the linguistic structure introduced by Saussure. The structure of signifiers in language is a spatial structure. Signifiers represent the subject to other signifiers through difference, and “the difference of the signifier from itself in its repetition is considered by Lacan one of its fundamental properties” (Carrington, 54).

## Topologies

Lacan’s best-known topology that contributes to a spatial conception of the unconscious is the Borromean knot (Figure 6) which displays the mathematical interlinking of the Imaginary, Symbolic, and Real orders (Carrington, 30): the Imaginary, which is the ego, conscious thought and perception; the Symbolic, which entails the Other, which comprises the linguistic structure of signifiers that defines the subject; and the Real, the inaccessible unconscious, the void around which desire circulates and for which the *petit objet a* stands in, at the center of the Borromean knot. Numbers are related to desire through metonymy, as desire is found in the gaps in conscious experience and knowledge (48). The spatial structuring of language leads to the spatial structuring of the unconscious. The unconscious is in the gap between cause and effect, where the “order of the non-realized” is located (*The Four Fundamental Concepts of Psycho-Analysis*, 22, quoted in Carrington, 58–9). The gaps and discontinuities that reveal the unconscious “can be understood as markers of a space whose continuity is determined by a further dimension which we cannot access directly, but only through a sequence of such discrete (as opposed to continuous) points of encounter” (Carrington, 59). According to Carrington, “positing the existence of a higher spatial dimension can reconcile what appears fragmented in three dimensions with the compactness and continuity of a space defined by four dimensions,” in a way that corresponds to the relationship between the Symbolic and Real.

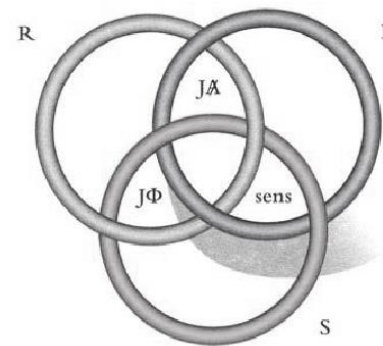


Figure 6.

<sup>24</sup> Jacques Derrida, *Positions*, trans. Alan Bass (Chicago: University of Chicago Press, 1981), p. 27, quoted in Jonathan Culler, *On Deconstruction: Theory and Criticism after Structuralism* (Ithaca: Cornell University Press, 1982), p. 97.

Lacan added a fourth deformed ring to the three interlinked rings of the Borromean knot (Figure 7) to represent the *sinthome*, in *Seminar XXIII: Le sinthome, 1975–1976*. The *sinthome* is enjoyment made possible through creative identification with the symptom (*Enjoy Your Symptom!*). It is inscribed in the unconscious, expressed in *lalangue*, linking jouissance to the signifier through the Real. The sinthome is related to the return of the repressed through the caesura, the gap between cause and effect. The caesura is the gap or in-between space of Freudian transference, an interstitial or liminal space. According to Freud, the space in which transference occurs is a “specific region” (*bestimmten Gebiete*) likened to a “playground” (*Tummelplatz*).<sup>25</sup> “The transference thus creates an intermediate region [*Zwischenreich zwischen*] between illness and life through which the transition from the former to the latter is made” (1958, 154). The intermediate region is the space of the in-between, the gap, the divide, through which a crossing or transition (*Übergang*) occurs, being an essential part of the psychoanalytic cure. Both transference and regression take place in space and time. Regression involves the backward movement of mental processes towards earlier and simpler forms of experience, which takes place in the analytic experience.

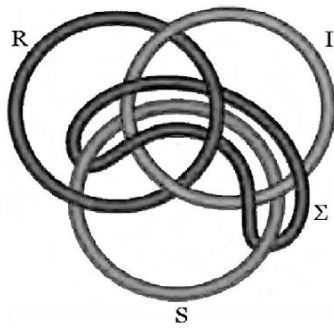


Figure 7.

According to Ellie Ragland, topology shows “the real structure which cannot speak itself.”<sup>26</sup> According to Will Greenshields, “topology allowed Lacan to present and demonstrate the structural paradoxes that define the psychoanalytic subject as distinct from the subject of conscious self-apprehension.”<sup>27</sup> According to Anca Carrington, the chains of signifiers moving on the surface of language make it a topological space (167). At the level of conscious experience, the unconscious can only be perceived in fragments, discontinuous, in pulsation, incomplete and elsewhere than the subject. The smooth surfaces of the topological figure perhaps belies the homogeneity of the unconscious beyond fragmented rational thought and the heterogeneity of sense perception (80). Topological forms appear in architecture in the use of parametrics, the projection of mathematical grids onto curved three-dimensional surfaces, as practiced by architects such as Zaha Hadid and Patrik Schumacher (Figure 8).

Georges Bataille, in “The Pineal Eye,” described the rational subject as enclosed in the “degrading chains of logic,”<sup>28</sup> or in “closed systems assigned to life by reasonable conceptions.”<sup>29</sup> The subject is defined in the struggle with the signifying structure of human thought. In such a struggle, “being is ‘ungraspable’—it is only grasped in error.”<sup>30</sup> For Bataille, the Symbolic, the structure of

<sup>25</sup> Sigmund Freud, *Erinnern, Wiederholen und Durcharbeiten (Remembering, Repeating and Working-Through)*, in *Gesammelte Werke*, Vol. 10 (Albany: Imago Publishing, 1946, [1914]), p. 134. Quoted in Steven Jaron, “Liminal Experiencing in the Psychoanalytic Field,” in *Space in Psychoanalysis, Psychoanalysis in Space*, ed., Agata Bielińska and Adam Lipszyc (London and New York: Routledge, 2024), pp. 36–49, pp. 43–4.

<sup>26</sup> Ellie Ragland, “The topological dimension of Lacanian optics,” in *Analysis* 11 (2002), pp. 115–26, p. 122, quoted in Carrington, p. 166.

<sup>27</sup> Will Greenshields, *Writing the Structures of the Subject: Lacan and Topology* (London: Palgrave Macmillan, 2017), pp. 32–3, quoted in Carrington, p. 167.

<sup>28</sup> Georges Bataille, “The Pineal Eye,” in *Visions of Excess, Selected Writings* (Minneapolis: University of Minnesota Press, 1985), p. 80.

<sup>29</sup> Georges Bataille, “The Notion of Expenditure,” in *Visions of Excess*, p. 128.

<sup>30</sup> Quoted in Jean-Louis Baudry, “Bataille and Science: An Introduction to Inner Experience,” in *On Bataille, Critical Essays*, ed. Leslie Boldt-Irons (Albany: State University of New York Press, 1995), p. 276.

language, entails a representation of perceived reality wherein existence is a “neatly defined itinerary from one practical sign to another” (*Visions of Excess*, 82), and “acts undertaken with some rational end are only servile responses to a necessity” (231). According to Lacan, “it is thus that the functions of mastery which we incorrectly call the synthesizing functions of the ego, establish on the basis of a libidinal alienation,” the alienation of the ego, “the development that follows from it, namely, what I once called the paranoiac principle of human knowledge, according to which its objects are subjected to a law of imaginary reduplication, evoking the homologation of an endless series of notaries...” (*Ecrits, A Selection*, 138).

It is Bataille’s desire to escape the cycle of functionalism and stasis created by language and by the ego, the heterogenous, waste, expenditure, to search for something in life which is other to it. As he wrote in *Eroticism, Death and Sensuality*, “there is in nature and there subsists in man a movement which always exceeds the bounds, that can never be anything but partially reduced to order. We are generally unable to grasp it. Indeed it is by definition that which can never be grasped, but we are conscious of being in its power: the universe that bears us along answers no purpose that reason defines.”<sup>31</sup> For Lacan the movement is the movement of the unconscious, which exceeds the bounds of conscious reason, which is unable to be grasped, that is exterior to the universe of the Symbolic, the universe of language, a universe which cannot answer to its own premise, because it is only a partial reality, and which is heterogeneous. The smooth and continuous forms of the topological structures of Lacan reveal the homogeneity of the unconscious, inaccessible to conscious thought.

According to Bataille, in “The Notion of Expenditure,” “human life cannot in any way be limited to the closed systems assigned to it by reasonable conceptions. The immense travail of recklessness, discharge, and upheaval that constitutes life,” could be expressed by stating that life starts only with the deficit of these systems” (*Visions of Excess*, 128). Human life cannot be limited by conscious reason; the discharge and upheaval within the systems of reason are the manifestations of the unconscious in conscious thought, which is made present in the deficit of the systems of reason, in the absences, gaps, scotomata, and *méconnaissance* that reveal the limitations of reason. Bataille seeks, as described in “The Pineal Eye,” a transgression of the “degrading chains of logic” (80) of conscious thought; he seeks “a new laceration within a lacerated nature,” access to the Real. According to Anca Carrington, “In the same way that fragmented conscious experiences can appear as disconnected and unintelligible when considered one by one, in isolation, but unified and decipherable once the hypothesis of the unconscious has been made,” referring to Freud in *The Unconscious* (*SE 14*, London, 1915, 167), “so the recognition of the fourth dimension [of the unconscious] can inform about the coherence and totality of apparently fragmented partial encounters in three dimensions” (80). Psychoanalysis aims at “facilitating a subjective invention that deals with the fundamental unruliness and discontinuity of human experience” (157), according to Carrington.

The main argument of Anca Carrington’s book *The Unconscious as Space* is that the Real of the Lacanian unconscious entails a fourth dimension that is unknowable, in the same way that a fourth dimension in perceived space would be imperceptible. “The notion of space is significantly



Figure 8.

<sup>31</sup> Georges Bataille, *Eroticism, Death and Sensuality* (San Francisco: City Light Books, 1986), p. 40.

removed from the view of space as the container of the world and of time as a fourth dimension” (150). Again, according to Hawking and Penrose in *The Nature of Space and Time*, “what we experience as ‘physical reality’ may actually be some kind of boundary of a higher-dimensional structure” (141). Likewise, as Lacan wrote, “the very level of the definition of the unconscious... that what happens there is inaccessible to contradiction, to spatio-temporal location and also to the function of time” (*The Four Fundamental Concepts of Psycho-Analysis*, 31). Carrington writes, “we are not biologically equipped to perceive space other than as a projection, but we can make up for this deficiency by using the rigour of mathematical thinking. Or, in Lacanian mode, the Symbolic is there to address that in which the Imaginary fails” (71). “Thus, Lacan’s formalization of the unity between inside and outside through the Möbius strip is the closest we can get to understanding something that we are not biologically equipped to see” (82). Carrington invokes Plato’s Allegory of the Cave. The higher, more dimensional world is outside the cave and beyond the shadows that the prisoners can only see (72). “Shadows or projections create distortions and overlaps, a loss of information that warps the perception of the higher-dimensional object. In a world of shadows, any perception is a misperception” (73). As described by Plato, “the ascent into the upper world and the sight of the objects there,” on the other side of the curtain wall, outside the cave, is “the upward progress of the mind into the intelligible region” (517),<sup>32</sup> an understanding of the self outside of perception and language, in the unconscious.

Outside those used by Lacan, topologies that can suggest a fourth dimension include the Penrose Diagram and the Penrose Stairs, and the Voronoi Diagram and the Voronoi Hyperbolic Diagram. The Penrose Diagram (Figure 9), named for Roger Penrose, is a two-dimensional diagram that helps visualize a curved four-dimensional space-time manifold. The horizontal dimension represents space, and the vertical dimension represents time. Time is a non-spatial variable. The Penrose Stairs (Figure 10) go up and down in a continuous loop; they inspired the work of Escher. The Voronoi Diagram (Figure 11), named for Georgy Voronoi, is a field of faceted or tessellated segments applied to a surface. The Hyperbolic Voronoi Diagram (Figure 12) defines the surface of the four-dimensional hyperbolic space of Hermann Minkowski. As can be seen, these models have applications for architecture. The Voronoi tessellations can be combined with parametrics (Figure 13). A Voronoi sculpture installation at the Victoria and Albert Museum in London, by Sou Fujimoto, called *Inside Outside Tree* (Figure 14), models the converging of inside and outside in *extimité*, similar to the Möbius band.

“Mathematically, a four-dimensional space includes the entirety of any three-dimensional space,” as described by Anca Carrington (63). “What appears to be fragmented and repetitive at the level of experience can be understood as the necessary consequence of dimensional incompatibility between our capacity to perceive and experience, and that which is to be perceived as arriving from the unconscious....” The totality that resides in another dimension is structurally out of reach, as in the One of Plotinus, for example. According to physics, all matter comes from light, and all multiplicity comes from singularity. Four-dimensional space is generated by the movement of a volume

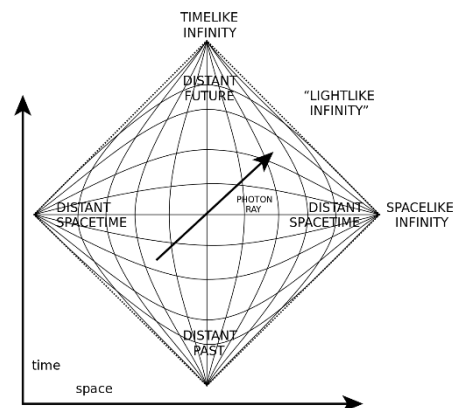


Figure 9.

<sup>32</sup> Plato, *The Republic*, trans. Desmond Lee (London: Penguin Books, 1955).



inside itself, in a direction it does not contain, to create a hyperspace (84). Geometry is a branch of mathematics, is a pure construction of thought, and cannot be perceived as a quality of the Real (85). It is possible that the fourth dimension is a purely mathematical concept.

## Space and Time

Space and time are abstract concepts constituted on the basis of sense perception. “According to Kant, space is a priori because it comes before the empirical, it is not sensed. Higher-dimensional space, while it is not sensed, does not come to us in the same way. It is a product of the understanding alone, an a posteriori concept without empirical content.”<sup>33</sup> Nevertheless, the definitions of space and time as provided by Kant established an important basis for Freudian and Lacanian psychoanalysis. In the transcendental aesthetic of Kant, in the *Critique of Pure Reason* (*Kritik der reinen Vernunft*, A version 1781, B version 1787), what we perceive to be space and time do not exist outside of our thought. Geometry and mathematics are in fact abstract representations of space and time which have no basis in the sensory world. Knowledge can only relate to sensible objects by means of intuition. “In whatever manner and by whatever means a mode of knowledge may relate to objects, intuition is that through which it is in immediate relation to them, and to which all thought as a means is directed” (A19).<sup>34</sup> The object, or phenomenon, is the “undetermined object of an empirical intuition” (A20). The phenomenon consists of matter and form; the matter is that part of the phenomenon which corresponds to sensation, while the form is that part of the phenomenon which can be arranged under certain relations. The matter of the phenomenon corresponds to the sensible form as opposed to the intelligible form, which corresponds to the form of the phenomenon for Kant.

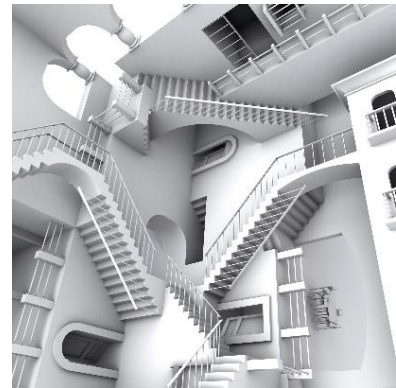


Figure 10.

Both the matter and the form of the phenomenon are determined a priori; the a priori conception of the sensible form results in the perception of the form, while the a priori conception of the intelligible form results in the understanding of the phenomenon as part of a synthetic whole in the ordering of the phenomenal world. The intelligibles form a totality or manifold that organises the sensible world, in unconscious thought. The particulars of the sensible world are perceived in such a way that they conform to a totality, through the process of apperception, a function of unconscious thought. Unconscious apperception organises the differentiated particulars of sense perception into a totality given only by the categories of a priori intuition. The totality of the world as it is perceived is given by the categories of geometry and mathematics, derived from space and time, in a priori intuition in unconscious thought.

Sensibility, the capacity for receiving representations, is the source of intuition, which allows sensible objects to be thought in understanding, from which arise conceptions, according to Kant. Objects, and intuitions, are given by sensibility; they are thought in the “understanding,” from

<sup>33</sup> Carrington, pp. 76–7, quoting Mark Blacklock in *The emergence of the fourth dimension: Higher spatial thinking in the fin de siècle* (Oxford: Oxford University Press, 2018), p. 168.

<sup>34</sup> Immanuel Kant, *Critique of Pure Reason*, trans. Norman Kemp Smith (London: Macmillan / New York: St Martin’s Press, 1968).



Figure 11.

dental, pure form of sensuous intuition, which arranges the manifold and varied content of the phenomenal world. The manifold content of the phenomenal world is arranged and viewed under a certain set of arrangements, which are determined by intuition, and concept in understanding. Objects can only exist in perception insofar as they are in a certain relation to other objects; objects cannot exist in perception without a relation to other objects. In the transcendental concepts of time and space, a moment in time cannot exist without a relation to other moments in time, and a point in space cannot exist without a relation to other points in space. Time, space, and the manifold of phenomenal objects in perception thus can only exist in a conceptual continuity, a reality manufactured by human reason.

Kant defines the “Transcendental Aesthetic” as the ‘science of all principles of *a priori* sensibility ...’ (A21). There are two principles of *a priori* knowledge which underly all forms of sensuous intuition: space and time. Space and time are not “real existences,” but rather “merely determinations or relations of things ...” (A23). Space and time are not concepts which have been developed from outward or empirical experience in their entirety, but rather entail a dialectic between empirical experience and concept in understanding, manifest as intuition. Pure empirical experience does not exist, as proposed by phenomenologists. External or empirical experience is itself only possible as a result of *a priori* intuition, as sense experience is conditioned by what is understood in the mind, in unconscious thought. The perception of a sensible form is determined by an understanding of the corresponding intelligible form in the mind. A phenomenal object can only be perceived once it is understood in its relation to the totality or manifold of reality, as constructed in the mind.

Space is a necessary *a priori* representation, and it is the condition for the possibility of all phenomena. It is impossible to conceive of the nonexistence of space; for that reason alone space cannot be seen as a phenomenal reality. It is also impossible to conceive of the nonexistence of

which arise conceptions. Thought is related to intuition, and to sensibility, by signs or symbols. Sensible objects can only be thought as representations. All words in language are representations. Sensations cannot arrange themselves or assume certain forms; forms must exist *a priori* in the mind, and be seen as separate from sensation. In the pure forms of sensuous intuition which exist in the mind *a priori*, “all the manifold of intuition is intuited in certain relations.”

Kant distinguishes between the sensation and the intelligible, as the intelligible entails an arrangement of sensations, and the sensation assuming a form. The matter of phenomena is given *a posteriori*, following the form of phenomena in the mind; the *a priori* form must thus be seen as separate from sensation, and juxtaposed to it, in a contradiction between intelligible and sensible. What is *a priori* in the mind is the transcen-

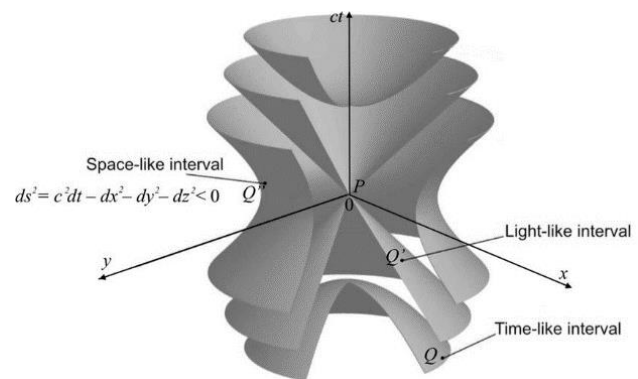


Figure 12.

time, and all relationships are perceived in space and time. Modern physics tells us that the universe had a definite beginning and will have a definite end in both spatial and temporal terms, but it is impossible to conceive of anything prior to or posterior to space and time, just like it is impossible to conceive of experience after death, except as a mythology. While space and time are manifest in discursive reason as containing relationships within a manifold totality, they themselves cannot be concepts of relationships, but rather a priori concepts which are formed prior to sensory experience, much like the archetype or intelligible in classical philosophy, in the active intellect or noesis (*nous*), which is manifest in intelligible form in relation to sensible form, or the unconscious in psychoanalysis. Following the principles of space and time, geometry and mathematics are also products of a priori intuition.

According to Kant, space is not a concept which is derived from outward experience, nor from relations between external phenomena. External experience is on the contrary only possible through the antecedent representation of space. Space is a necessary a priori representation; all



Figure 14.

conceptions of space are based on a priori intuition, as are the principles of geometry. Space is not a discursive concept, as it cannot be divided or multiplied. Geometrical principles are apodictic, necessary truths. Rather than being based in the fragmented variability and malleability of the phenomenal world, they are a priori intuitions applied to reality. They cannot be varied to conform to sensible phenomena; rather, sensible phenomena must conform to them. Mathematics and geometry, time and space, are not properties inherent to sensible objects which have an existence insofar as they are in conformance with a manifold set of rules and principles. Space is not a quality of an object, nor is it a quality of relations between objects; it has no relation to sensible objects other than as providing a field in which sensible objects can be perceived and understood, as in the space of the psyche.

A part of time cannot be understood outside of the manifold of time, as a part of space cannot be understood outside the manifold of space. Time and space are, rather than qualities of the phenomenal world, properties of the intuition of the perceiving subject. They are the extensions of the psyche. Time and space determine the “relation of representations in our inner state” (B50), the representations of perceived phenomena. Time and space function as a syntax for the language of internal representation; they are the mechanism by which perceptions are organised and understood. Meaning is created in language through a relationship between signifiers, so time is a necessary a priori principle for meaning in language, and the communication of meaning in the visual language of architecture, which also requires a syntax, an underlying matrix of rules of representation, which include mathematics and geometry, in order for meaning in representation to be communicated insofar as it participates in a manifold.

All communication in language requires a shared acceptance of a manifold, composed of syntactical rules based in the a priori principles of space and time. Space and time are constructed, artificial mechanisms through which all thought, language, communication, and meaning are

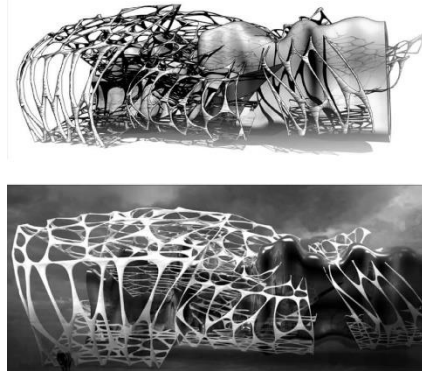


Figure 13.

generated. If space and time do not exist other than as transcendental intuitions in the mind, in unconscious thought, then their grounding for all communication and meaning reveals a void within all communication and meaning, and within human identity. Meaning and communication have a metaphysical basis which is not to be found in phenomenal reality. Any meaning or communication which is achieved in a syntax in language, cannot be related to the phenomenal existence of the signifiers in the language.

Space and time, as internal *a priori* intuitions, can provide no form themselves, but can only be represented in forms, in formal analogies, such as cyclical or linear progression. The perception of a sensible object requires a dialectic between the sensible form of the object and the intelligible understanding of the object, as a relation in a manifold, which is given a sensible form in representation. Space and time can only be represented through figural language, in linguistic tropes; they cannot be represented in literal language, because they do not exist in the phenomenal world. It is impossible to perceive space or time; only relations within space and time can be perceived, as they have been determined in *a priori* intuition. The immediate condition of all internal, subjective phenomena, in perception and intellection, mediates all external phenomena in perception and intellection. Space and time are the modes of representation of the perceiving and thinking subject as object. Reason becomes aware of itself in consciousness, and objectifies itself, through the representations of space and time. Space and time are the conditions of the sensibility of the subject, the conditions of the subjective experience of reality, which is the necessary basis of reality. Space and time are the representations from which “bodies of *a priori* synthetic knowledge can be derived” (B55), which include geometry and mathematics in discursive thought or cognition.

### Bioconstructivism

One other topological model that I might suggest for psychoanalysis and architecture is Bioconstructivism. A good example is a graduate studio project by a student of mine in Spring 2011 at Roger Williams University, Cummings School of Architecture, called *Endless Dreamscape* (Figure 15). Bioconstructivism involves topology theory, epigenesis, the epigenetic landscape, morphogenesis, catastrophe and catastrophe theory. Topology theory entails transformational events or deformations in nature which introduce discontinuities into the evolution of a system. Epigenesis entails the generation of smooth landscapes, in waves or the surface of the earth, for example, formed by complex underlying topological interactions. The epigenetic landscape is the smooth forms of relief which are the products of the underlying complex networks of interactions. Morphogenesis describes the structural changes occurring during the development of an organism, wherein forms are seen as discontinuities in a system, as moments of structural instability rather than stability. A catastrophe is a morphogenesis, a jump in a system resulting in a discontinuity. Catastrophe theory is a topological theory describing the discontinuities in the evolution of a system in nature.

In contrast to the calculus of Newton and Leibniz, where trajectories of bodies are plotted

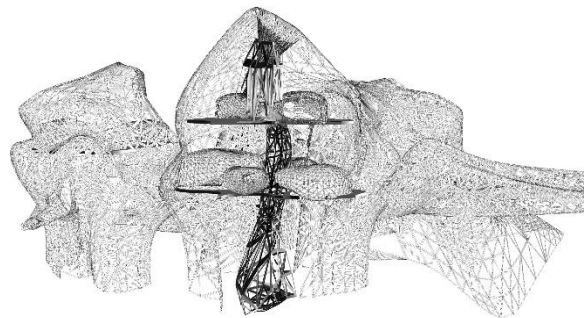


Figure 15.

against an immobile space the coordinates of which are described in numerical terms such as  $x$  and  $y$ , topology describes transformational events or deformations that result in discontinuities in the evolution of a system. Topological mapping is not determined by the gridded quantification of a substrate space, but rather by singularities, occurrences of self-generation or immanence, in the flow of space of which the mapping is a part. The simplistic singularities of flows on a plane are combined to create complex and variegated forms. Attractors and separatrices create topological formations, as in the epigenetic landscape. The Aristotelian concept of epigenesis was revived in Conrad Waddington's *Strategy of the Genes* in 1957, as a biological metaphor for cell reproduction, and in Helmut Müller-Sievers' *Self-Generation* in 1997. The epigenetic landscape displays the relation between phenotypes or phenomenal forms and the morphogenetic fields in which their formation takes place. The multiplicities of the valleys in the landscape correspond to the possible trajectories of bodies, or the shapes formed.

Form evolves along a pathway through surface differentiations, represented by the potential trajectory of a ball along the surface. The path of the ball is subject to external forces, so the evolution of the form is not predetermined. The modulations of the epigenetic landscape create default scenarios that frame the evolution of the form, which is only virtual, as the product of the complex convergences of vectors or forces. Through time, the form evolves as a singularity which corresponds to a phenomenal force in the real world. Forms and forces in the real world do not "exist" as such but are rather actualized or unfolded in time as morphological events or differentiations. A phenomenal form or force is an interruption of the continuous flux of possibilities, a disturbance of a continuum. In morphogenesis, all forms are seen as discontinuities in a system. Morphogenesis refers to the biological process that causes an organism to develop its shape. In catastrophe theory, a dynamical system is composed of a distribution of differences or potentials. Potentials operate along vectors in vector fields. For example, a book falls from a shelf to the floor, caused by gravity, along a vector in a vector field defined by attractors, the shelf and the floor. The catastrophe is the mutation of a system to a different level of organization, for example the replacement of the shelf by the floor as the attractor. The momentary stability of the book on the shelf, amidst the flux of vectors and attractors, can be seen as a form.

A form is a structurally stable moment in the evolution of a dynamic system, at the point of its passing to a structurally instable moment. A system is dynamic if it is continually transforming from stability to instability. The form is the equilibrium at the threshold in a dissipative system. All forms in the phenomenal world are products of the mapping of thresholds between stability and instability in dissipative or dynamic systems. A form should be seen as an event. Forms and forces in the phenomenal world mirror the virtual forms and forces modeled in topological or virtual space. Every form or force enfolds within it a multiplicity of possibilities of forms and forces. The catastrophe is the point at which a system flips to a different organization, and a different form is produced. Lacanian psychoanalysis puts an emphasis on discontinuity and transformation; our minds are rapidly shifting. Physics likewise describes a world in perpetual movement.

In DNA cell reproduction, forms evolve along vectors through topological space, but external forces cause flips in the organization of the system, causing all resultant life forms to be unique. This can be modeled geometrically, and applied to architecture. For example, units of geometries can be organized in sequences, and be programmed to unfold in self-generation, but the width and length of the geometrical units, in the context of the sequence, may cause a divergence in the direction of the generation, a catastrophe which causes its reorganization. The resultant form of the system, its moment of stability, disguises its organizational logic, as do life forms.

The form as event or catastrophe evolves in relation to a control space or attractor, which is the Cartesian parameter space. The trajectory projected into the space above the plane is a virtual universal unfolding resulting in a cusp or catastrophe set. The combination of continuous and discontinuous behaviors results in unpredictable unfolding through time in the event space or catastrophe surface, producing virtual event-forms or catastrophes. In *Animate Form*, Greg Lynn described form as a virtual force or vector in a trajectory, resulting in immanence and singularity. Form is defined by “multiple interacting vectors that unfold in time....”<sup>35</sup> The vectors enter a topological space which is “differentiated by gradients of force.” Architectural form is redefined as it is “modeled as a participant immersed within dynamical flows.” Topological space is described as an “animate field” (32). The shape of a body in space is transformed as it evolves through series of gradient spaces to topological space.

The project by the student Amy Lewis displays the catastrophic jumps in epigenetic processes. The forms display the “modifications, perturbations, changes of tension or of energy” of matter, as described by Henri Bergson, in the words of Sanford Kwinter.<sup>36</sup> The forms display the vocabulary of “waves, fields, and fronts” of epigenesis. The forms display topological flows which are “scattered, accelerated, accreted, collided” (53) into diverse surfaces or developmental fields. The forms display a dialectic between the stable and continuous and the unstable and discontinuous. The discontinuity of the forms is a sign of morphogenesis. Catastrophic mutations take place between different levels of activity and organization. The presence of forms as “structurally stable moments within a system’s evolution” (59) is subsumed into a process of evolution or mutation. Moments of structural stability are juxtaposed with moments of structural instability, to represent the contradiction inherent in self-generation or emergence, autopoiesis.

The composition can be seen as a “dissipative system,” a dynamic evolving system of matter. The composition can be seen as a catastrophe because each singular form can be seen to be the product of a multiplicity of forces, singular and multiple causes simultaneously. The combinations of multiple and contradictory forms result in irregular and discontinuous formal relationships which create a dynamic, emerging composition. Trajectories of forms suggest development and change, and transformation through time. The trajectories incorporate realized forms as well as forms which are not yet actualized, but are present as traces, as enfolded “in between” the realized forms. The unrealized forms are related to the actualized forms in a continuum of contradictions. The architectural composition should be seen as an “event,” as an occurrence in nature, both biomimetically and allegorically, involving continuity and interruption, singularity and multiplicity, predetermination and immanence. The self-generation of the forms situates the unpredictable within the predictable, as can be found in DNA cell reproduction. The architecture models the human mind.

Within a continuity, the morphogenesis of the forms results in structural changes (as represented by the forms), which occur during the developmental process of an organism in nature. The forms in the composition display the transformational events or deformations that result in discontinuities and contradictions, according to topology theory. The forms display the dynamic of morphogenesis, as a system of discontinuities, involving the simultaneous transformation of every individual part of a system. The emergence of a singular form within the system, in catastrophe theory, is a moment of structural instability rather than a moment of structural stability. In Amy Lewis’ composition, moments of structural instability are juxtaposed with moments of structural

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<sup>35</sup> Greg Lynn, *Animate Form* (New York: Princeton Architectural Press, 1999), p. 11.

<sup>36</sup> Sanford Kwinter, “Landscapes of Change: Boccioni’s *Stati di animo* as a General Theory of Models,” in *Assemblage 19* (Cambridge, MA: The MIT Press, 1992), p. 52.



stability. In the morphogenesis of the catastrophe, certain configurations will remain stabilized, while other configurations will point toward destabilization, or structural instability. Equilibrium is juxtaposed with disequilibrium. The singularity of the surfaces of the forms in the epigenetic landscape contradicts the complex network of interactions of topological forces from which they result. Actions in the environment on unstable, unstructured forms, and undifferentiated structures, result in stable, structured forms, and differentiated structures. There are many ways in which architecture can model topologies and spatial relations between conscious and unconscious thought, and many ways in which physics and psychoanalysis intersect.

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## Figures

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- Figure 3. From Ferdinand de Saussure, *Course in General Linguistics*, trans. Wade Baskin, New York: McGraw-Hill, 1966 (1915), p. 111.
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- Figure 5. Cindy Sherman, *Untitled #176 (Disaster Series)*, 1987, artnet.com.
- Figure 6. Jacques Lacan, Borromean knot, RSI system, researchgate.net, altered by author.
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- Figure 9. Penrose Diagram, Wikipedia.org, public domain.
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Figure 14. Voronoi sculpture installation at the Victoria and Albert Museum in London, by Sou Fujimoto, called *Inside Outside Tree*, [wordpress.com](http://wordpress.com).

Figure 15. Amy Lewis, *Endless Dreamscape*, from John Shannon Hendrix, *The Contradiction between Form and Function in Architecture*, London and New York: Routledge, 2013, p. 200.