Eisenman Architects, Virtual Plan, Virtual House, Berlin, Germany, 1997.
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Diagram
An Original Scene of Writing

Peter Eisenman

Architect and theorist Professor Peter Eisenman (Cooper Union, Yale University and Principal, Eisenman Architects, New York), has generated perhaps the single most important research project on the diagram in architecture. From his PhD thesis and other texts to designs and built projects, Eisenman's work has consistently been determined by and depended on his rigorous and decades-long research into the architectural diagram. A seminal text in architectural diagram theory, this essay was first published in Eisenman's *Diagram Diaries* (1999) and has since become one of the most recent, significant and original contributions to architectural theory. The central subject of this essay is architecture's and the architectural diagram's relationship to writing and the text. For Eisenman, the diagram traces and writes, and can be traced and read in, architecture. As such, the diagram mediates between the history of architecture (diagrams of anteriority) and the ways in which this is traced in a real building and the other possible buildings that are within it (diagrams of interiority). Diagrams of exteriority, those from outside architecture, are defined as agents from the 'specific site, the programme, or the history'. Through his concept of 'superposition', Eisenman's account of the diagram demonstrates a close reading of Derridean deconstruction and other Postmodern, post-Structuralist theories of the diagram, language, text and writing which are together marshalled to critique 'the premise of architecture's origin in presence'. Effectively placing architecture on a new ontological, metaphysical and epistemological basis, this account uses the diagram to expand architecture into a more complex concept. Drawing on such diverse fields as metaphysics, aesthetics, psychology and literary theory, Eisenman references Villard d'Honnecourt, Palladio, Serlio and Le Corbusier from the history of architecture as well as such diverse thinkers as Wittkower, Freud, Foucault and Deleuze. This central text in his theoretical corpus introduces many of the concepts and lines of thought that he was to elaborate in other essays in *Diagram Diaries*, and in a second, later book on the diagram, *Feints* (2005), and through designs and built projects around the world.

As in all periods of supposed change, new icons are thrust forward as beacons of illumination. So it is with the idea of the diagram. While it can be argued that the diagram is as old as architecture itself, many see its initial emergence in Rudolf Wittkower's use of the nine-square grid in the late 1940s to describe Palladian villas. The diagram's pedigree continued to develop in the form of the nine-square problem as practised in the American

architectural academy of the late 1950s and early 1960s, when it was seen as an antidote to the bubble diagramming of the Bauhaus functionalism rampant at Harvard in the late 1940s and to the *parti* of the French academy that was still in vogue at several East Coast schools well into the late 1960s. As a classical architectural diagram, the *parti* was embodied with a set of pre-existent values such as symmetry, the *marche* and *poché*, which constituted the bases of its organising strategy. The bubble diagram attempted to erase all vestiges of an embodied academicism in the *parti*. In so doing, it also erased the abstract geometric content of the nine-square.

Generically, a diagram is a graphic shorthand. Though it is an ideogram, it is not necessarily an abstraction. It is a representation of something in that it is not the thing itself. In this sense, it cannot help but be embodied. It can never be free of value or meaning, even when it attempts to express relationships of formation and their processes. At the same time, a diagram is neither a structure nor an abstraction of structure. While it explains relationships in an architectural object, it is not isomorphic with it.

In architecture the diagram is historically understood in two ways: as an explanatory or analytical device and as a generative device. Although it is often argued that the diagram is a post-representational form, in instances of explanation and analysis the diagram is a form of representation. In an analytical role, the diagram represents in a different way from a sketch or a plan of a building. For example, a diagram attempts to uncover latent structures of organisation, like the nine-square, even though it is not a conventional structure itself. As a generative device in a process of design, the diagram is also a form of representation. But unlike traditional forms of representation, the diagram as a generator is a mediation between a palpable object, a real building, and what can be called architecture's interiority. Clearly this generative role is different from the diagram in other discourses, such as in the parsing of a sentence or a mathematical or scientific equation, where the diagram may reveal latent structures but does not explain how those structures generate other sentences or equations. Similarly, in an architectural context, we must ask what the difference is between a diagram and a geometric scheme. In other words, when do nine squares become a diagram and thus more than mere geometry?

Wittkower's nine-square drawings of Palladio's projects are diagrams in that they help to explain Palladio's work, but they do not show how Palladio worked. Palladio and Serlio had geometric schema in mind, sometimes explicit and sometimes implicit, which they drew into their projects. The notations of dimensions on the Palladian plans do not correspond to the actual project but to the diagram that is never drawn. A diagram implicit in the work is often never made explicit. For example, as Kurt Forster has noted, in the earliest parchment drawings in architecture, a diagrammatic schema is often drawn or etched into the surface with a stylus without being inked. The later inking of the actual project over this then becomes a superposition of a diagrammatic trace. In many of these drawings – from late Gothic architecture to the Renaissance – the overlay does not
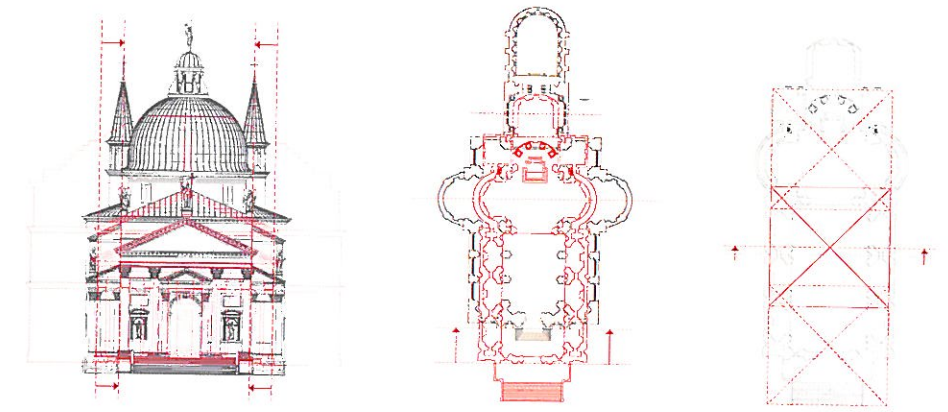
Peter Eisenman, Diagrams of Anteriority, 1982. Analytical diagrams of the Church of the Redeemer, by Andrea Palladio, Venice, Italy. Reproduced by permission of Peter Eisenman. © Peter Eisenman.

actually take all of the diagrammatic imprint, only partial traces of it. The quality of the ink on the page changes where it runs over the diagram as opposed to the places where the diagram is actually part of the plan of the building. Thus, there is a history of an architecture of traces, of invisible lines and diagrams that only become visible through various means. These lines are the trace of an intermediary condition (that is, the diagram) that exists between what can be called the anteriority and the interiority of architecture; the summation of its history as well as the projects that could exist are indexed in the traces and the actual building.

The diagram is not only an explanation, as something that comes after, but it also acts as an intermediary in the process of generation of real space and time. As a generator there is not necessarily a one-to-one correspondence between the diagram and the resultant form. There are many instances, for example in Le Corbusier's Modulor, where the diagram is invisible in the building, yet it reappears as a repetitive element that occurs at many different scales, repeated in little segments of houses to large segments of urban plans, yet it is rarely an explicit form. Thus Le Corbusier's statement that the plan is the generator will be seen to be different from the diagram is the generator. There are many examples of diagrams where a variety of shapes can be arrived at through a geometry that is exfoliated into different shapes. For example, Villard d'Honnecourt used geometric matrices to evolve natural and animal forms. One of the most interesting is the manifestation of a camel drawn from interlocking squares and diagonals. In the chateau architecture of the Loire valley in the 16th century there are irregular forms that could only have been produced through some sort of manipulation of diagrammatic geometry into a three-dimensional process called 'stereotomy'. Stones were cut from templates generated by these kinds of diagram. As Kurt Forster notes, in the late Gothic, for example, there is a diagrammatic process that leads the schematic articulation of foliage on column capitals to change from a stylised or conventional nature with bilateral symmetries to a more naturalistic, free-form nature. Such a process differs from the straightforward manipulation of geometry that was the tradition in

Gothic leaf capitals. The naturalistic evolution of these other capitals comes not from geometry but from a diagram. In this sense, the diagram becomes an intermediary condition between a regular base geometry and the capital itself. Here the diagram acts neither as geometry nor as the existent capital. It is a trace or phantom, which acts between something which can be called the interiority of architecture and the specific capital; between some explicit geometric formation which is then transformed by the diagram or intermediary process on to a result.

Reacting against an understanding of the diagram that characterised it as an apparently essentialist tool, a new generation, fuelled by new computer techniques and a desire to escape its perceived Oedipal anxieties – with regard to the generation of their mentors – is today proposing a new theory of the diagram based partly on Gilles Deleuze's interpretation of Foucault's recasting of the diagram as 'a series of machinic forces', and partly on their own cybernetic hallucinations. In their polemic, the diagram has become a keyword in the interpretation of the new. This question challenges both the traditional geometric bases of the diagram and the sedimented history of architecture, and in so doing they question any relation of the diagram to architecture's anteriority or interiority.

The second point Deleuze makes is that the diagram is different from structure. The classical architectural idea of a diagram exhibits a belief in structure as something that is hierarchical, static and has a point of origin. Deleuze says that a diagram is a supple set of relationships between forces. It forms unstable physical systems that are in a perpetual disequilibrium. Deleuze says that diagrams that deal with distribution, serialisation and formalisation are all structural mechanisms in that they lead to structure and a belief in structuring as an underlying principle of organisation. If a structure is seen as a vertical or hierarchical ordering of its constituent parts, the diagram must be conceived both horizontally and vertically, both as a structure and something which resists structuring: 'From one diagram to the next, new maps are drawn; thus there is no diagram that does not also include besides the points which it connects up (that is, besides its structural component) certain relatively free or unbound points, points of creativity, change and resistance to that existing building.' In this sense, diagrams are those forces which appear in every relation from one point to another, as superimposed maps. The distinction between Deleuze's idea of superimposition and my use of the term superposition is critical in this context. Superimposition refers to a vertical layering differentiating between ground and figure. Superposition refers to a coextensive, horizontal layering where there is no stable ground or origin, where ground and figure fluctuate between one another.

Thus diagrams for Deleuze must have a non-structuring or informal dimension. It is 'a functioning abstracted from any obstacle or friction, detached from any specific use'. This is an important movement away from the classical idea of an architectural diagram. Deleuze says that 'a diagram is no longer an auditory or visual archive, but a map, a cartography that is coextensive with the whole social field. It is an abstract machine.'

This abstract machine is defined by its functioning in unformed matter, as a series of processes that are neither mechanical nor organic. The diagram then is both form and matter, the visible and the articulable. Diagrams for Deleuze do not attempt to bridge the gap between these pairs, but rather attempt to widen it, to open the gap to other unformed matters and functions which will become formed. Diagrams, then, form visible matter and formalise articulable functions.

RE Somol follows Deleuze in situating these ideas of the diagram in architecture. For Somol, diagrams are any kind of explanatory abstraction: 'cartoons, formulas, diagrams, machines, both abstract and concrete. Sometimes they are simply found and other times they are manipulated.' A partial list of what Somol labels as 'previous' diagrams includes the nine-square, the Panopticon, the Domino, the skyscraper, the duck and the decorated shed, the fold, and bachelor machines. Somol says that he is searching for an alternative way of dealing with architecture's history, 'one not founded on resemblance and return to origins but on modes of becoming an emergence of difference'. The problem with this idea of the diagram as matter, as flows and forces, is that it is indifferent to the relationship between the diagram and architecture's interiority, and in particular to three conditions unique to architecture: (1) architecture's compliance with the metaphysics of presence; (2) the already motivated condition of the sign in architecture; and (3) the necessary relationship of architecture to a desiring subject.

Somol's argument for a diagrammatic project takes as axiomatic that every design project, whether in practice or in the university, needs to take up anew the issue of what constitutes the discipline or, in other words, that architecture both as a discipline and a social project needs to suspend and rearrange ruling oppositions and hierarchies currently in operation. This would suggest that design projects and processes cannot simply be derived from their contexts, but rather must *transform* their very social and intellectual contexts. In this sense, Somol's diagrammatic process, as a machinic environment, is already given as a social project. That is, it is not abstract or autonomous, but rather presumes that architecture already contains in its being (ie its interiority) the condition of the social.

If in the interiority of architecture there is a potentially autonomous condition that is not already socialised or that is not already historicised, one which can be distilled from a historicised and socialised interiority, then all diagrams do not necessarily take up new disciplinary and social issues. Rather, diagrams can be used to open up such an autonomy to understand its nature. If this autonomy can be defined as singular because of the relationship in architecture between sign and signified, and if singularity is also a repetition of difference, then there must be some existing condition of architecture in order for it to be repeated differently. This existing condition can be called architecture's interiority. When there is no interiority, that is, if there is no relationship between interiority and the diagram, there is no singularity which defines architecture.

If architecture's interiority can be said to exist as a singular rather than dialectical manifestation of a sign that contains its own signified, the motivation of the sign is already internalised and thus autonomous. Yet if the diagram is already social, as Somol suggests, this definition immediately historicises autonomy. The notion of the diagram being proposed here attempts to overcome the historicisation of the autonomy of architecture, that is, the already motivated nature of architecture's sign.

In this context, the relationship between the diagram and architecture's interiority is crucial. Foucault's understanding of an archive as the historical record of a culture, and of an archaeology as the scientific study of archival material, can be translated as architecture's anteriority and interiority. These cannot by their very nature be constituted merely by unformed matter, as Somol suggests, but in fact already contain presence, motivated signs and a psychical desire for delineation by the subject of both ground and figure. A diagram of instability, of matter and flows, must find a way to accommodate these concerns specific to architecture. In this context, another idea of the diagram can be proposed, one which begins from Jacques Derrida's idea of writing as an opening of pure presence.

For Derrida, writing is initially a condition of repressed memory. The repression of writing is also the repression of that which threatens presence, and since architecture is the *sine qua non* of the metaphysics of presence, anything that threatens presence would be presumed to be repressed in architecture's interiority. In this sense, architecture's anteriority and interiority can be seen as a sum of repressions. While all discourses, Derrida would argue, contain repressions that in turn contain an alternative interior representation, architecture must be seen as a special case because of its privileging of presence. If Derrida is correct, there is already given in the interiority of architecture a form of representation, perhaps as the becoming unmotivated of the architectural sign. This repressed form of representation is not only interior to architecture, but anterior to it. It is this representation in architecture that could also be called a writing. How this writing enters into the diagram becomes a critical issue for architecture.
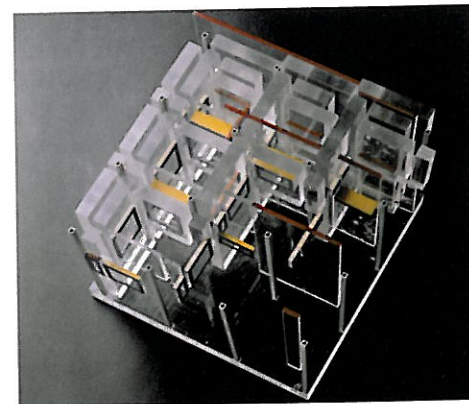
House II, Plexiglass, 1969–70.
Reproduced by permission of Peter Eisenman. © Peter Eisenman.
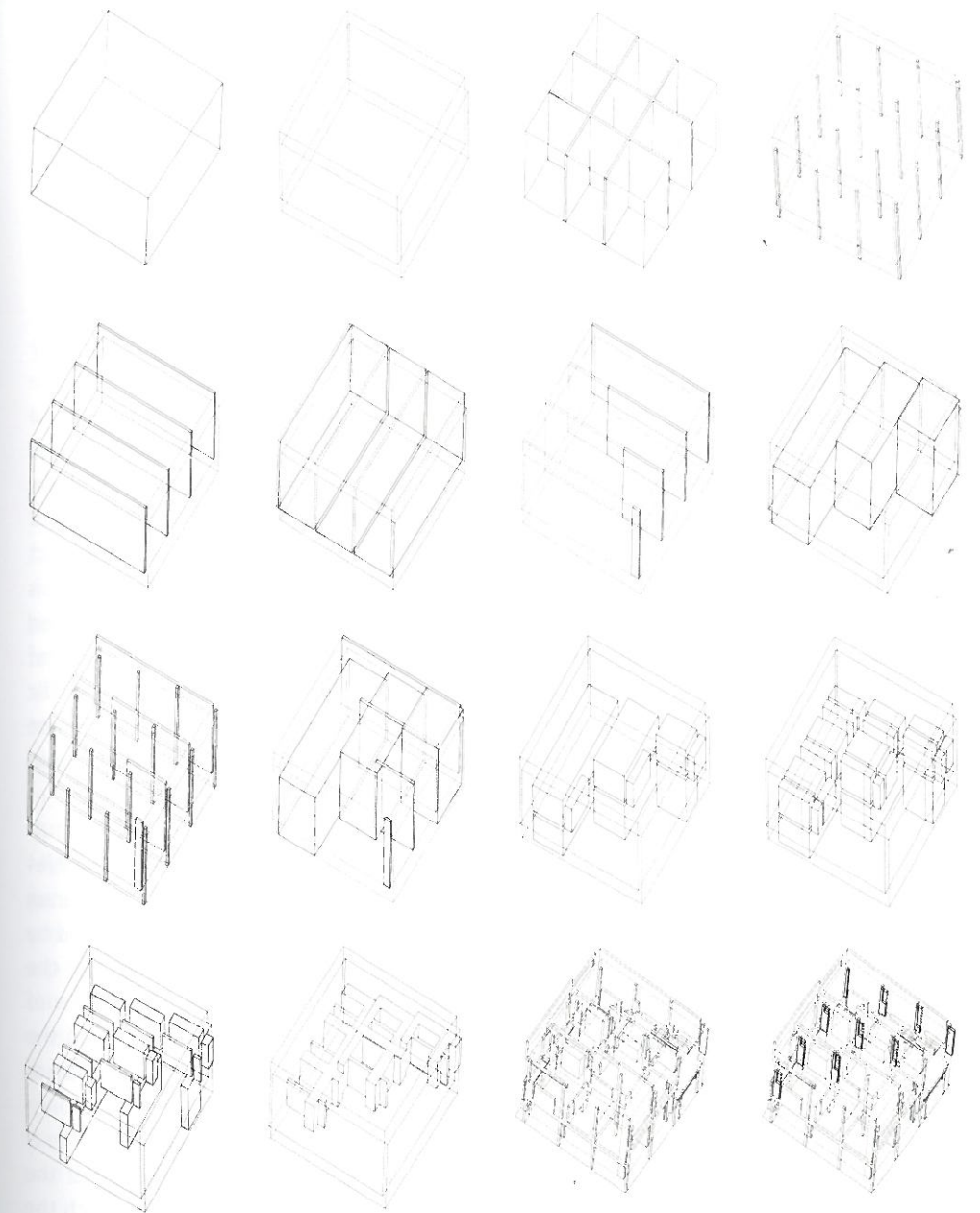
Peter Eisenman, House II, 1969–70. Diagrams of interiority: developmental sequence of the diagrams for House II showing the shifting, doubling and layering operations in the design process. Reproduced by permission of Peter Eisenman. © Peter Eisenman.

One way that memory overcomes forgetting is through mnemonic devices. Written lists are a form of mnemonic device, but one that is graphic and literal; they do not represent or contain a trace. In architecture, literal notations can produce a plan but they have nothing to do with the diagram, because a plan is a literal mnemonic device. A plan is a finite condition of writing, but the traces of writing suggest many different plans. It is the idea of the trace that is important for any concept of the diagram, because unlike a plan, traces are neither fully structural presences nor motivated signs. Rather, traces suggest potential relationships, which may both generate and emerge from previously repressed or unarticulated figures. But traces in themselves are not generative, transformative or even critical. A diagrammatic mechanism is needed that will allow for both preservation and erasure and that can simultaneously open up repression to the possibility of generating alternative architectural figures which contain these traces.

Derrida says, 'We need a single apparatus that contains a double system, a perpetually available innocence and an infinite reserve of traces.' A diagram in architecture can also be seen as a double system that operates as a writing both from the anteriority and the interiority of architecture as well as from the requirements of a specific project. The diagram acts like a surface that receives inscriptions from the memory of that which does not yet exist – that is, of the potential architectural object. This provides traces of function, enclosure, meaning and site from the specific conditions. These traces interact with traces from the interiority and the anteriority to form a superposition of traces. This superposition provides a means for looking at a specific project that is neither condemned to the literal history of the anteriority of architecture, nor limited by facts, the reality of the particular site, programme, context or meaning of the project itself. Both the specific project and its interiority can be written on to the surface of a diagram that has the infinite possibility of inscribing impermanent marks and permanent traces. Without these permanent traces there is no possibility of writing in the architectural object itself.

If architecture's interiority is seen as already written, then Derrida's use of Freud's double-sided Mystic Writing Pad could be one model for describing a conception of a diagram different from both the traditional one in classical architecture and the one proposed by Somol. Neither of these considers in any detail architecture's problem with the metaphysics of presence, the unmotivating of the sign, or the psychical problem of repression in both the interiority of architecture and in the subject. The analogy of the Mystic Writing Pad is useful because the specific conditions of site and the anteriority of architecture both constitute a form of psychical repression.

The Mystic Writing Pad, as proposed in Freud's analogy, consists of three layers: the outer layer or surface where the original writing takes place, a middle layer on which the writing is transcribed, and underneath, a tablet of impressionable material. Using a stylus, one writes on the top surface. Because of the surface underneath, the top surface reveals a series of black lines. When the top surface is lifted from the other two, the black lines

disappear. What remains is the inscription on the bottom surface, the trace of the lines that have been drawn. The indentations made by the stylus remain, always present. Thus there are infinite possibilities for writing and rewriting on the top surface and a means of recording the traces of this writing as a series of superpositions on the tablet underneath. This recalls the traces of the earliest incisions on parchment that already exist in the anteriority of architecture as described above.

The architectural diagram, like the Mystic Writing Pad, can be conceived of as a series of surfaces or layers which are both constantly regenerated and at the same time capable of retaining multiple series of traces. Thus, what would be seen in an architectural object is both the first perceptual stimulus, the object itself, along with its aesthetic and iconic qualities, and another layer, the trace, a written index that would supplement this perception. Such a trace would be understood to exist before perception, in other words, before a perception is conscious of itself.

Derrida says, 'Memory or writing is the opening of that process of appearance itself. The "perceived" may only be read in the past, beneath perception and after it.' The diagram understood as a strata of superposed traces offers the possibility of opening up the visible to the articulable, to what is within the visible. In this context, architecture becomes more than that which is seen or which is present; it is no longer entirely a representation or an illustration of presence. Rather, architecture can be a re-presentation of this intervening apparatus called the diagram. In this sense, the diagram could be understood to exist before the anteriority and the interiority of architecture. It exists as the potential space of writing, a writing which supplements the idea of an interiority before perception. This idea of an interiority as containing a palimpsest of an already written undercuts the premise of architecture's origin in presence.

But there is also a temporality involved in the processes of the diagram. Derrida says that the Mystic Pad includes in its structure what Kant describes as the three modes of time: permanence, succession and simultaneity. The diagram, like the writing pad, contains the simultaneity of the appearance on its surface, what would be akin to the black lines on the top layer of the pad, as well as the indentations in the wax below: the second aspect of the time of the diagram is succession, which is akin to the lifting up of the pad and is involved in erasure and the posting of a new image. This is the permanence in the wax itself. The diagram presents in such a context a discontinuous conception of time as the periodicity and the spacing of writing. These three conditions of time are not linear or connected in a narrative way. Thus, the diagram is an intermediate or interstitial condition which lies between in space and time – between the architectural object and the interiority of architecture.

Writing implies that in an architectural object, the object's presence would already contain a repetition. In this sense an architectural object would no longer be merely a condition of being, but a condition which has within itself both a repetition of its being
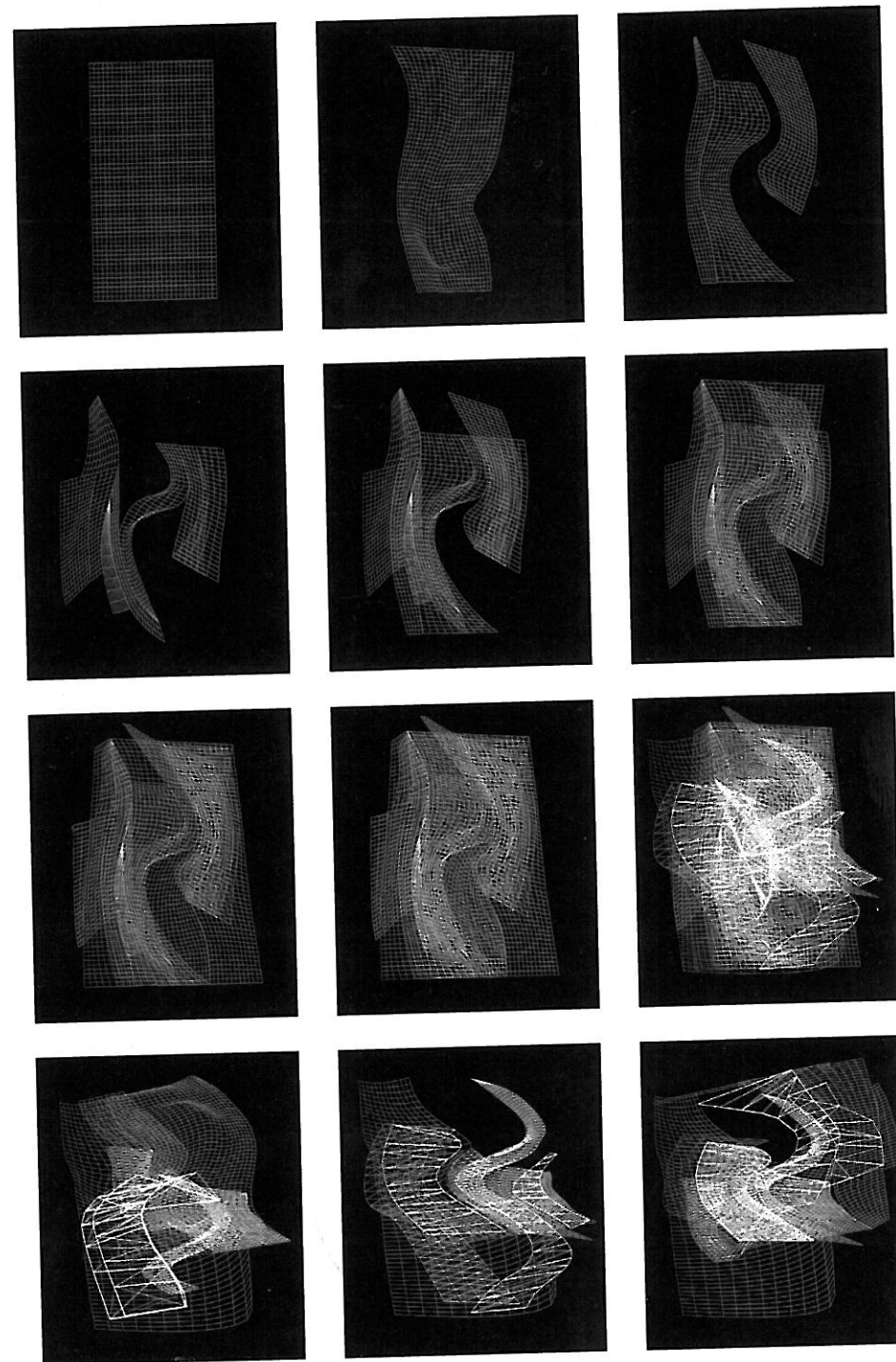
Peter Eisenman, Staten Island diagrams, Staten Island Institute. 1997–8. Diagrams of exteriority: sequence showing the superposition and laminar flows diagrams for the Staten Island Institute competition project. Reproduced by permission of Eisenman Architects. © Eisenman Architects.

and a representation of that repetition. If the interiority of architecture is singular as opposed to dialectical, and if that singularity can be defined as a repetition of difference, then architecture's interiority may be already written.

There is a second concern that the diagram must address, and that is the potential for the becoming unmotivated of the sign. The already written introduces the idea of the index into the architectural object. The index is the first movement away from a motivated sign. Here, another layer must be added to the strata of the diagram, one which, through a process of blurring, finds new possibilities for the figural within architecture's interiority that could not have come from that interiority. An external condition is required in the process, something that will introduce a generative or transformative agent as a final layer in the diagrammatic strata. This external agent is not the expression of a desiring subject, but rather must come from outside of architecture as some previously unfigured, yet immanent agent in either the specific site, the programme or the history. It could take the form of a transparent pattern or screen, which causes the already imprinted to appear as other figurations, both blurring and revealing what already exists. This is similar to the action of a moiré pattern or filter, which permits these external traces to be seen free of their former architectural contexts.

The diagram acts as an agency which focuses the relationship between an authorial subject, an architectural object and a receiving subject; it is the strata that exist between them. Derrida says that 'Freud, evoking his representation of the psychical apparatus, had the impression of being faced with a machine which would soon run by itself. But what was to run by itself was not a mechanical representation or its imitation but the psyche itself.' The diagrammatic process will never run without some psychical input from a subject. The diagram cannot 'reproduce' from within these psychical conditions. The diagram does not generate in and of itself. It opens up the repression that limits a generative and transformative capacity, a repression that is constituted in both the anteriority of architecture and in the subject. The diagram does not in itself contain a process of overcoming repression. Rather, the diagram enables an author to overcome and access the history of the discourse while simultaneously overcoming his or her own psychical resistance to such an act. Here, the diagram takes on the distancing of the subject-author. It becomes both rational and mystical, a strange superposition of the two. Yet according to Freud, only the subject is able to reconstitute the past; the diagram does not do this. He says, 'There must come a time when the analogy between this apparatus and the prototype will cease to apply. It is true that once writing has been erased the Mystic Pad cannot "reproduce" it from within; it could be a Mystic Pad indeed if, like our memory, it could accomplish that.'

The Hammer and the Song

Sanford Kwinter

In this edited version of the essay by Professor Sanford Kwinter (Harvard University Graduate School of Design), published in both the *Diagrams* issue of *OASE* (no 48, 1998) and in *ANY* magazine's *Diagram Works* (no 23, 1998), he describes the diagram as both scientific and explanatory as well as literary and illocutionary; the eponymous 'hammer' and 'song' of the title. Beginning with a comparison of historical precursors and precedents for the modern concepts of the diagram, he invokes Kant, Nietzsche, Hume, Foucault, Deleuze and Guattari. However, it is Goethe, 'the father of the modern concept of diagram', and his dynamic, genetic interpretation of form that Kwinter finds most relevant as the basis for his analysis of the architectural diagram. Referencing Jakob Johann von Uexküll's *Umwelt*, Panofsky's ideas about perspective as a diagram itself and Cassirer's theory of symbolic form, he describes how in the years after the Second World War applications of 'invisible material logics to explain and generate reality' by science and engineering (such as nuclear power, radar, microwaves, etc) were influenced by research in information science. For Kwinter, the diagram (not just as template but as flow) 'or topologised schema' offers the possibility for the plastic interchangeability of subject and object. Kwinter posits the diagram as 'the play of form ... seen as a perpetual communication of moduluses, or impetuses – generating centres ... fundamentally geometric in nature'. The incorporeal, which Kwinter highlights as one of the 'major challenges of contemporary design practice' (he provides examples including the Constructivists, Eisenstein, Kubrick, Buckminster Fuller, Robert Smithson and the aesthetico-philosophical urbanist movements of the 1950s and 1960s) is linked to a biogenetically based model of 'genotypic diagrammatism as underlying all phenotypic or formal expression'. Related to the theories of 'fields' he helped to popularise in the 1980s, his 'conductivity hypothesis' of the diagram is most clearly influenced by theories in mathematics, while biology is used to articulate a new metaphysics and ontology of the diagram as abstract machine/model of transitions, integration, coordination and the organisation of space. In Kwinter's search for diagrams for architecture which exemplify the complex and emergent forms and patterns of organisation and intelligence, he finds the paradigms of biology, systems theories and the other complexity sciences appropriate because they 'give us the most useful understanding of the dynamic, algorithmic nature of diagrams'. He extends his argument by stating that architecture and diagrams, as part of our mental technologies, can play a privileged role (through the 'materialisation of actualisation') in liberating the imagination from 3-D experiences and the 'curse' of 'invisible processes' and 'hidden diagrams'; and that they can show us the shapes of those processes, events and effects that form our world and lives. Kwinter's essay is an investigation of the history and present diversity of the diagram's relations to paradigms of rationality, predictability, validity, verifiability, truth and logic. It also looks at the key categories and phenomena analysed and operationalised in diagrams as they relate to the methods and methodologies of different schools of thought and praxis. He concludes by finding each of these functions of the diagram necessary to maintain a check on the 'excesses' of the others and to ensure the mobility of thinking and action in the modern world.

Concept and Reality

The role that the diagram is now playing in our attempts to theorise material reality in the late 20th century is not so different from the way the concept of the 'schema' was used by Kant to theorise Newtonian reality in the late 18th century. Both serve as synthetic explanatory devices (though no less real for that) that open up a space through which a perceptible reality may be related to the formal system that organises it, whether this latter is a priori or a posteriori as in the Kantian/Humian version. Another great thinker of the same era who ought not to be left out of consideration is Goethe, who, it can be argued, rejected the (apodictic) Kantian-Newtonian model in favour of a genetic interpretation of form. In brief, he placed his wager on the side of development, lodging the explanatory device in the space of abstract interactions taking place over time, so that form was always moving and represented only a visible, frozen section through a more fundamental organising logic that itself could be intuited, analytically described, but never actually held in the hands. Indeed Goethe is the father of the modern concept of diagram insofar as he insisted on formation as the locus of explanation, not appearance. This work can be found in all of Goethe's work on natural philosophy, on intuition, but most explicitly in his scientific writings, especially those on botany.

The relationship between perception, concept and reality is clearly related to the development of the schema concept of Kant. For Kant, the world of experience was divided into a 'material' and a 'formal' component. Material referred to sense-qualities found on the side of the object, the world, or, in the Kantian jargon, of the 'manifold'. The formal domain, that which we are interested in when we want to understand the diagram, belongs on the side of the perceiving mind or agent; it refers to an a priori organisation – this is Kant's Newtonian absoluteness speaking – a kind of engram or partitioning algorithm that lets sense experience – matter – enter into relation with itself to form higher level meanings and unities (I believe this to be the proto-origin of modern Gestalt theory). The formal, however, appears on the side of the subjective; it corresponds to the a priori schema which on its own is hollow, and must be filled in with data acquired from outside through the senses. For Kant, each term of the pair is inseparable from the other: subject and object, perception and reality, schema and senses. Otherwise the world collapses into shapeless abstraction or a senseless kaleidoscopic scattering. It was the task of the 20th-century neo-Kantians, and it is our task as well, to topologise the field of the encounter of each of the pair of terms. The neo-Kantian biologist Jakob Johann von Uexküll played an important role in doing this when he invented the concept of the *Umwelt*. The early Panofsky, on the other hand, showed how perspective played such a diagrammatic role in the formation of a cognitive, technological and aesthetic Gestalt, and Cassirer developed a theory of 'symbolic form' which again posits the work of a generative, topologising diagram that engenders both subject and object in any given context.

By using the word topology here I wish to introduce not only the shifting, connected meshwork in which form and matter play out their alternating struggle and their dance, but to insist that the diagram should not be understood as a reduction of the manifold, but a contraction, or, to use the medieval term, a complication of reality harbouring within itself the perpetual capacity to explicate or unfold. The diagram – or topologised schema – represents the plastic aspect of reality: subject and object can virtually masquerade as one another. This obviously poses a whole new set of problems and possibilities for the theory of perception, and it certainly frees us from static, vision-based concepts of space. Somewhere here, we've jettisoned both Newton and Kant, even though they served as the primary ladders to our modern position.

We might say they emit formative and organisational influence that cannot help but be 'embodied' in all subsequent states of the given region of concrete reality in which it is placed.[1] But this represents a very complex play of hybridisation and creolisation because every component of what I have called concrete reality is itself the expression of many other previous diagrams that have only temporarily been resolved (or 'tested', as in an experiment) and lodged in form. The view of reality that I have always tried to foster in my work (and which I like to believe that I am drawing from Nietzsche) is precisely one in which the play of form is seen as a perpetual communication of moduluses, or impetuses – generating centres – which we are here agreeing to call diagrams. It is my view that these are fundamentally geometric in nature, but when I use the word geometry I of course am referring to the modern, non-Euclidean or 'rubber sheet' variety that deals with transitions and their logic … Diagrams then are active, and the view that sees them as mere blueprints to be translated or reproduced is outdated. The diagram is the engine of novelty, good as well as ill.

Abstract Machines
… It is worth pointing out though that the diagram concept functions in Foucault's book [*Discipline and Punish*] as if it, itself, were a diagram.[2] In other words, it functions as an embedded entity, separate yet indissociable from the concrete work-event (the book and system of concepts known as *Surveiller et punir*) that it animates and in which it resides. So how then do you isolate a diagram from the concrete events it generates? This is where Deleuze[3] has made his contribution to the problem, by identifying the diagram with a class of phenomena that he calls 'abstract machines'. Abstract machines are precisely what they claim to be: they are abstract because conceptually and ontologically distinct from material reality yet they are fully functioning machines nonetheless, that is, they are agencies of assemblage, organisation and deployment … The argument, stated simply, is as follows: to every organised entity there corresponds a microregime of forces that endows it with its general shape and programme. Every object is a composition of forces, and the compositional event is the work or expression of an abstract machine. What I call the 'conductivity hypothesis' is a major component of some mathematical work being done these days as well as work in the biological sciences. It states that

abstract machines, or organised shaping forces, or micromorphological regimes, are themselves part of larger assemblages, larger abstract machines through which they communicate as if across a single continuum. Events in one place transmit their effects and successes to other places, and indeed to other scales … Fields are one of the models with which scientists explain the incidents of influence that we are here agreeing by convention to call diagrams. There arise particular problems, of course, when one is careless in developing models to explain how remote events, or events separated in time rather than space are related (such as in the work of Rupert Sheldrake) but history is full of provocative non-metaphysical models to explain such phenomena as well. I bring this all up because I like to claim that what we are dealing with here is simultaneously a new type of materialism (as Foucault called it, 'un materialisme de l'incorporel') and a kind of neo-vitalism. It calls for a new epistemology of action and event, and sees forms and things as mere chimeras of these underlying diagrammatic processes. Politics must become the politics of the diagram and history must be seen as the history of diagrammatic life, not merely of the forms it threw up.

Approaching the incorporeal is one of the major challenges of contemporary design practice. There were times – more innocent times to be sure – when this was done with very little self-consciousness and with sweeping brilliance; one thinks of the work of Moholy-Nagy, the Constructivists, certain filmmakers from Eisenstein to Kubrick, Buckminster Fuller, Robert Smithson, the aesthetico-philosophical urbanist movements of the late 1950s and 1960s, etc. They seemed instinctively to understand their role as intermediaries and had a clear intuition of the interstitial space that they had to occupy to become diagrammatists … In biology one is quite at ease discussing the distinct domains of genotype (where data is encoded in a four-letter language of rudimentary instructions) and phenotype (the marvellously rich world of novel shapes and their concatenations), and, with a bit more strain, of an intermediary space that links the two and where regulatory processes guide the first into the second. It would already be something for designers to adopt the 'mechanistic genetic' position and conceive of a genotypic diagrammatism as underlying all phenotypic or formal expression. And yet, I will always insist that the diagram lies in the space between the two, in the wild field of cybernetic interactions (what Deleuze, after Bergson, has called actualisation), regulatory pressures and channels, and control loops. Thus, once again, one misunderstands the diagram when one conceives of it as a template rather than as a flow.

The Incorporeal
This is where the problem of diagrammatism takes on its post-war configuration. After the Second World War there was an extraordinary increase in the belief and application of science and engineering to everyday life, which brought along an increasing application of invisible material logics to explain and generate reality … the advent of controlled nuclear processes, microwave and radar signal processing, industrial applications of synthetic chemistry, ballistics and cryptology were almost entirely made

possible by both theoretical and practical advances in information science. Industrial societies became increasingly saturated with these new embedded logics and the corresponding motor habits that they produced, but they became subjugated by them invisibly, according to what one could call a 'subtle coup'. The diagram is now very usefully understood as informational. At present the sciences of complexity give us the most useful understanding of the dynamic, algorithmic nature of diagrams. Complexity theory can be said to target three primary phenomena in the natural and the non-natural world: integration, organisation and coordination. These phenomena undeniably exist in the world, but science has never been able to interrogate these phenomena in their customary numerical or 'hard' terms. Philosophy has always had to step in, along with some makeshift methods in the social sciences and occasionally aesthetics. When we, today, enquire into the nature and activity of the diagram we are asking: 'When something appears, what agencies are responsible for giving this particular shape to this particular appearance?' Complexity theory, or dynamical systems theory, is seeking to reconfigure the answer to this question by positing the perpetual interaction of moving, evolving systems: one invisible (the diagram) and one visible (the real). The primary phenomena studied by the new sciences are actually visible to, or intuitable by, a living observer, but not to a non-living one, say to a camera or a measuring device …

Next would be the phenomenon of organisation. Organisation played a central role in the life sciences in the 1920s and 1930s and then again in the 1960s to address the philosophical impasses that still carried over from the older mechanist-vitalist debates … Organisation relies on the notion of pattern, it attempts to explain how patterns can arise uniquely through internal controls, and how these control factors sustain themselves, take on a direction, and then assume the appearance of autonomy, or life. The concept of organisation targets primarily the emergence of sequenced events as the source of developmental mechanics and formal stability. These were exactly the questions that Foucault was asking about history at an institutional and discursive level …

Indeed complexity is the movement towards biology (some might say towards emergent intelligence, though forms of intelligence are around us everywhere, which is why we postulate the concept of the diagram as a regulatory or generative mechanism). It marks the transition where communication, control and pattern formation – in a single phrase, relationships of information – take over in an organised substrate from relationships of energy. Historically, this movement – the emergence of what I like to call a 'bio-logic' – began with the 19th century's science of heat (thermodynamics) as the study of ineluctable transitions (cold to hot, order to disorder, difference to homogeneity) and the theory of evolution (the homogenous and simple, to the differentiated and the complex). The life sciences could not fully emerge on an independent basis until a theoretical-mathematical basis could be provided for them. Physics itself had to become an 'information' science before biology could emerge gradually to supplant it. (This history goes from Boltzmann's statistical theory of gases to the post-war era's elaborations by

Norbert Weiner, Claude Shannon, Alan Turing and John von Neumann.) This view of history makes it very difficult to accept today's common view that wishes to see 'informatics' as a new or independent development in the history of ideas and aesthetics, as a putative 'third stage' following and supplanting the physics model and the biology model. What I call the biologic is the informational paradigm *par excellence* … Informational architectures were at the heart of American aesthetics since the 1960s – Robert Smithson is one important example – but the advent of electronic gadgetry and the emergence of overdeveloped communications infrastructure have not changed the fundamental problem one iota … I believe that architecture plays a privileged role here … Through the materialisation of actualisation, architecture has the capacity to free the imagination from three-dimensional experience, to free it from the curse of so-called 'invisible processes' and hidden diagrams and to show us that processes and events, the ones that give form to our world and our lives, have shapes of their own … The real world is always a world of effects (events), not quantities … The difference is that today we have a scaffold of mental technologies with which to investigate the qualitative world in a relatively systematic manner … Forces exist, and can be explained, even if they cannot be rigorously predicted. The classical prediction criterion hid this fact, and most of reality, from our purview. Designers were crippled by this exclusion, and were left either to tinker in the sandbox of 'styles' or else in the rarefied and bodiless realm of hyperrationalist abstractions … As to the question of whether the diagram is scientific and explanatory or literary and illocutionary (provoking acts not based on verifiable truth functions) I would hope that no one would ever be allowed to furnish a single or definitive answer. Clearly both functions are necessary, for each is necessary to protect us from the excesses of the other, and only the joint action of both together, in turn and in oscillation, can assure us the mobility of thought and action to sustain our own political apparatus in the face of a very fluid and labile enemy. The diagram gives us the power to programme historical becoming, as well as to hack the programmes currently in place. Diagrams must be conceived as songs as well as hammers. Truth, after all, is a function of will, not facts.

Notes

1   We will insist that diagrams are active and historical 'things' – like ideas or events – and therefore not unlike appliances in which are embedded rich and perpetually activated social, aesthetic and political diagrams.

2   Foucault gives it its most precise name: it is a 'diagram', that is to say a 'functioning', abstracted from any obstacle … or friction [and which] must be detached from any specific use. The diagram is no longer an auditory visual archive but a map, a cartography that is coexistensive with the whole social field. It is an abstract machine.

3   Gilles Deleuze, *Foucault*, University of Minnesota Press (Minneapolis), 1986/88, p 34