

ORTHOGONAL ALLEGORY: the reality of architectural plan drawing

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Thesis

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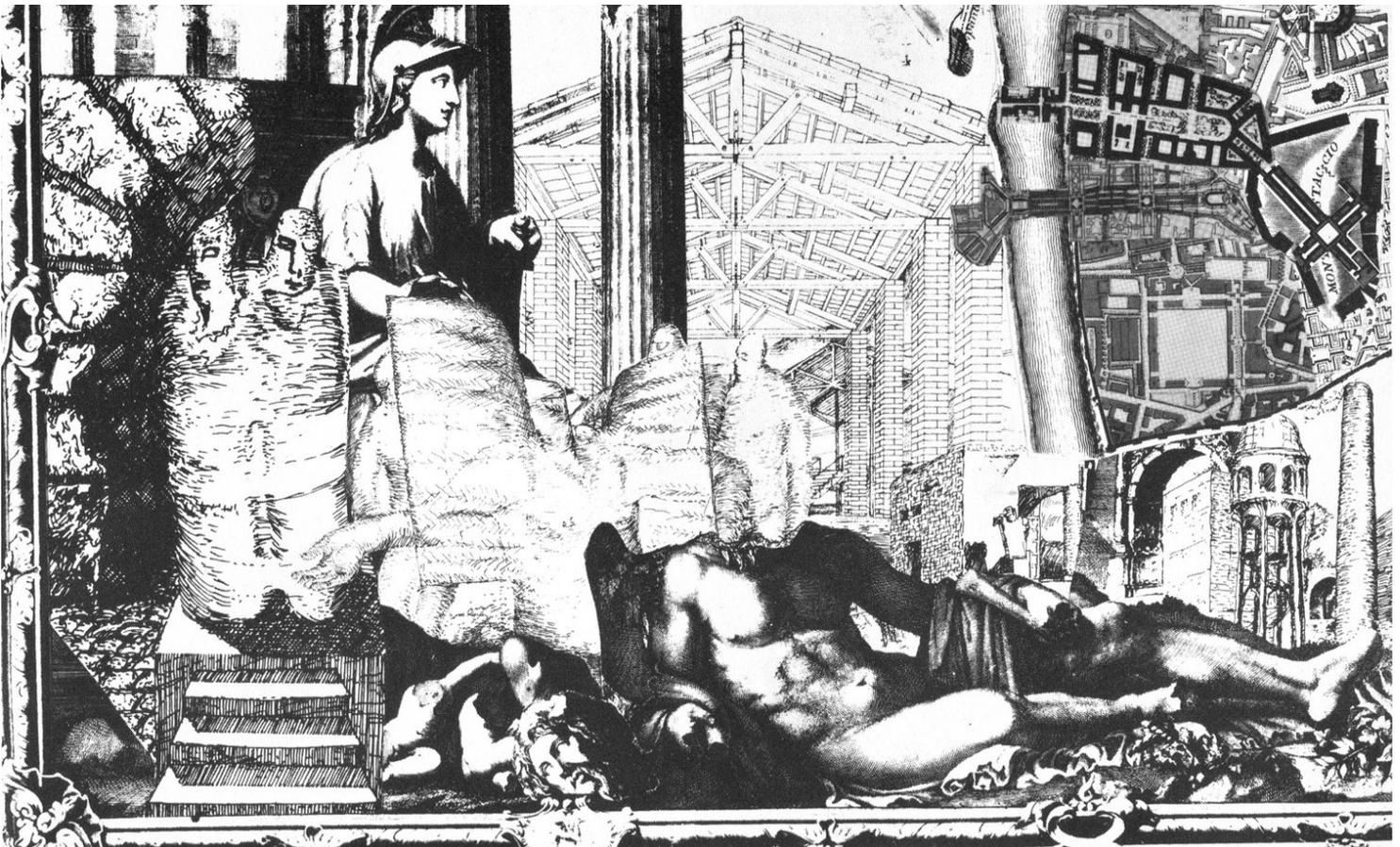
The floorplan takes a peculiar position in architectural creation. As a notational device, it translates the conception of a built space to a graphical code. The form of an orthogonal projection of a building abolishes the illusion of space, it excludes exactly the elements that are elementary to architectural expression, “light and shade, walls and space.”¹ It is a planar medium in which the spatial idea of a building is embodied, but it does not actually represent the body of a building as made of Masses and Surfaces. In the Three Reminders to Architects Le Corbusier defines architectural creation as constituted by three elemental components: Mass, Surface and Plan. “Mass and surface are the elements by which architecture manifests itself. Mass and surface are determined by the plan. The plan is the generator. So much the worse for those who lack imagination!”² Whereas Mass and Surface exist in and define the built form, the plan, the generator, is not of the same nature, it stands outside of the directly experiencable reality of architecture. It is the device that enables clear translation of an idea into Mass and Surface.

PRIMACY OF DRAWING

The notion of the architect as authorial figure coevolves with the introduction of notational devices, working drawings, in the 15th century, most notably in the inventions of Leon Battista Alberti. Alberti's notational devices gave birth to architecture as an allographic art, separating the architect from the craftsman, the idea from execution. The precise notation enables the identical reproduction of a building even in complete absence of the architect. These processes are still dominating in architectural creation far into the 20th century, though the notion of identity is increasingly challenged by CAD/CAM (Computer Aided Design/ Manufacturing) processes. It is thus founded in architectural notation, that a building is seen as the artistic creation of an individual architect in command of drawing, rather than the result of the accumulated knowledge of craftsmen. Through the independence of the architectural discipline, the plan's role as generator becomes two-fold, not only does the plan delineate the basic ‘syntax’ of a building, but

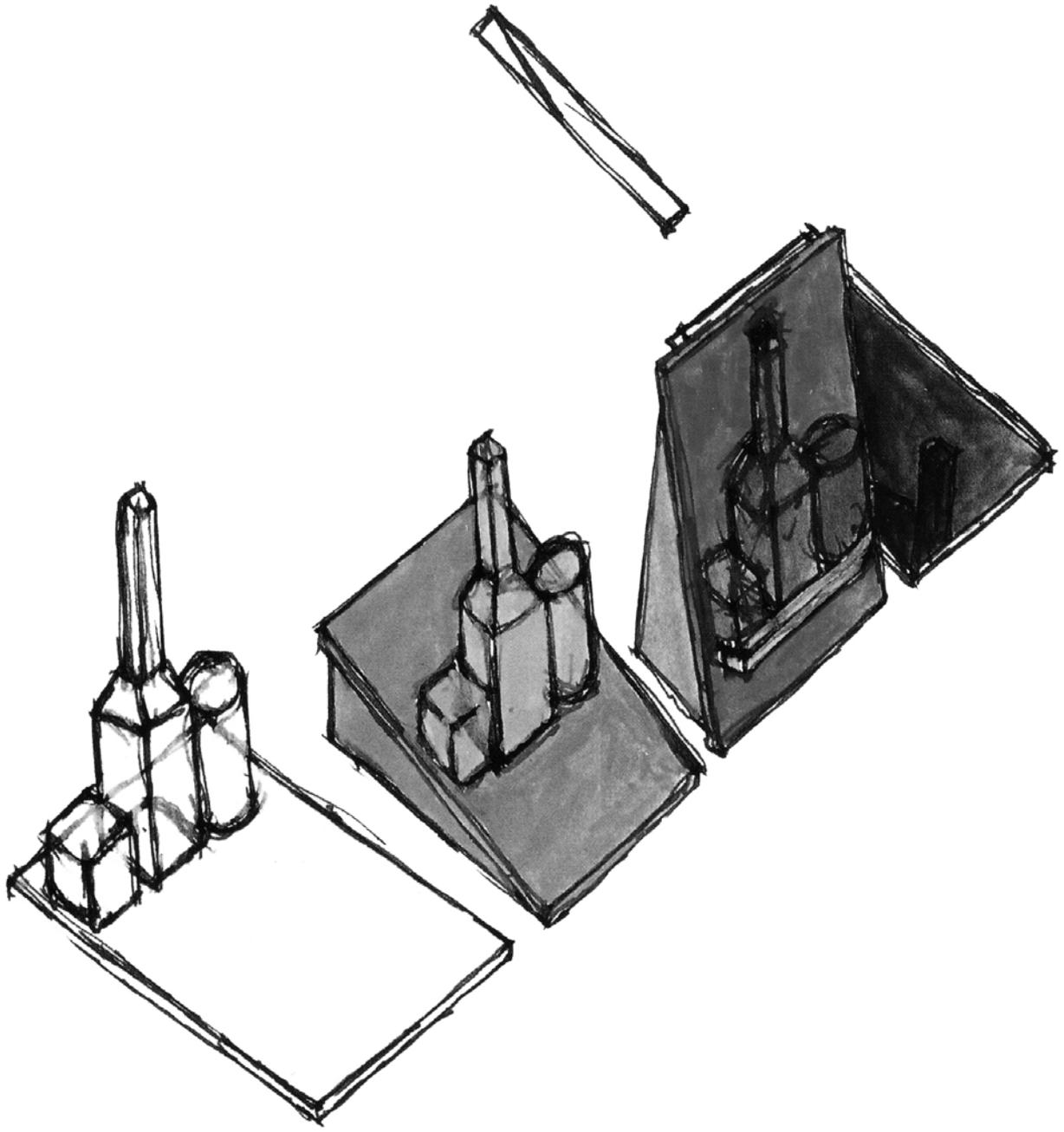
it also creates a reality on its own, through its allegory the plan creates an allegory. Especially in the 20th century, this detachment of the architect's work from the construction process facilitated a highly abstracted and theoretical development of architecture until the point where building is not even at the base of architecture anymore, where a drawing is equally considered a piece of architecture as a building is. Architecture developed into firstly a reflective practice and only secondarily the craft of construction, "In order to execute it is necessary to conceive... It is this product of the mind, the process of creation, that constitutes architecture"³. In this light it is not surprising at what ease architectural and philosophical terminologies are interchangeable and metaphorized between the two disciplines. A wide field of architecture in the 20th century took place only in notation, both graphical and textual, in the creation of theoretical and utopian scenarios, in a discourse on the foundations of architecture itself. Therefore we see the development of architectural forms as essentially connected to the development of its forms of representation.

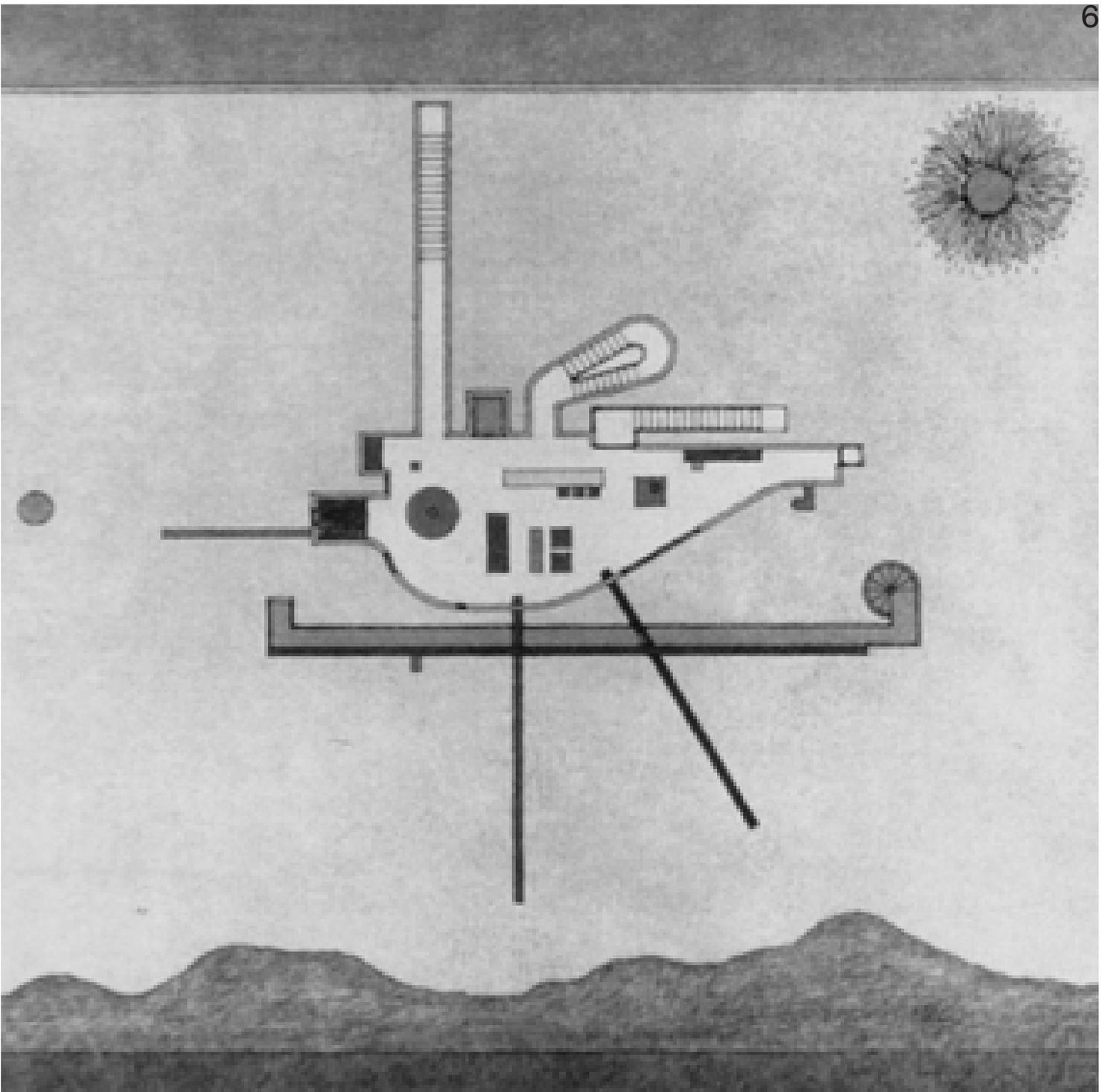
A Roma Interotta, contribution by Rob Krier, 1987
An architectural competition based on the Map of Rome
by Nolli, each participant proposing a vision of Rome,
based on the plan, not the real city



In this coevolution, a new meaning comes into existence, which goes beyond the indexicality of the working drawing. In Paul Auster's New York Trilogy, namely in *City of Glass*, the detective Paul Auster follows a man, Peter Stillman, through New York. Trying to make sense of his actions, he only discovers when he traces the Stillman's routes on a map, that Stillman was spelling out a message in the routes he walked, "TOWER OF BABEL". His walks take on a double reading, together producing an aim: in planar view, they serve as a structure to write out a message, in experienced space, he uses them to collect broken objects, from which he attempts to create a new language, by assigning them new names (as a broken object is not only an object in a different state, but a new entity). Both views, implementing completely different means of production, stand in an allegorical relation, allegory understood as a procedure in which one 'text' is read through another. Both texts have an autonomous narrative and form, though they contain each other.

A similar relation applies to the plan and the building, the drawing is not only the basis for the execution of a building and the building that plan executed, both are autonomous in their appropriate format and therefore their relation is not only indexical, but allegorical. In the case of Paul Auster his action becomes the reconstruction of Babel, and his language act (Spelling out Tower of Babel) inscribes Babel in New York as the names he gives to the objects are inscribed into them. Both drawing and building contain each other, but develop a reality on themselves. A shift in the picture plane, as suggested in the reading of *City of Glass*, builds the foundation of both a book, *Adjusting Foundations*, and a building, *The Wall House*, by the American architect and educator John Hejduk. At the basis of both stands the relation of the work of the still life painter and the architect: "If the painter could by a single transformation take a three-dimensional still life and paint it on a canvas into a *natura morta*, could it be possible for the architect to take the *natura morta* of a painting and by a single transformation build it into a still life?"⁴





C. John Hejduk
Early Sketch of the Wall House

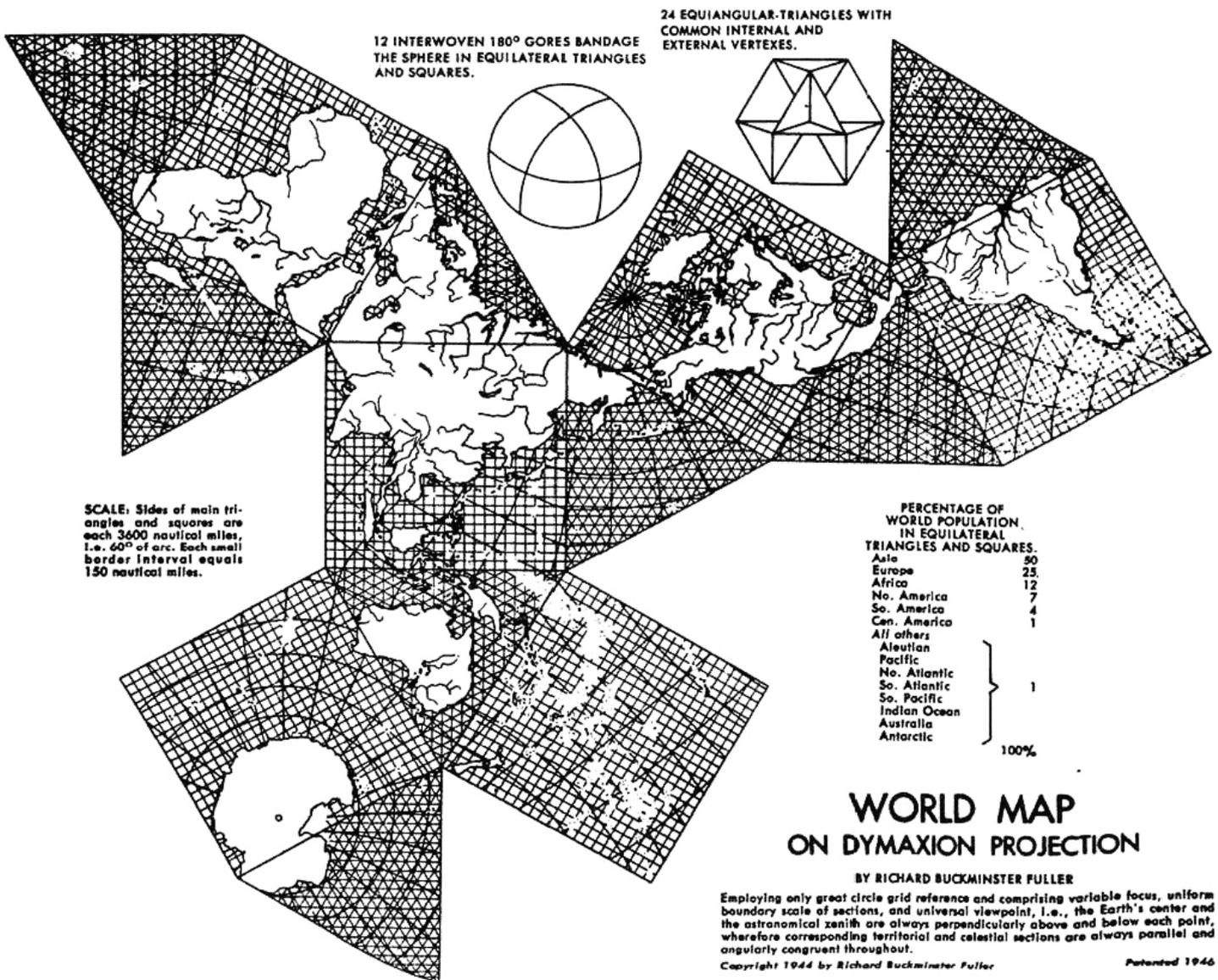
In an early sketch of the wall house, the building's plan is placed back into a pictorial setting, a landscape, horizon and sun. The shift in the picture plane thematized in the building is analogously incorporated in the plan drawing, it enables a poetic function of the plan, the plan's shape is transformed into a flying winged creature, anticipating Hejduk's later rather mystical, religious works on the Angelic. The drawing of a flying creature creates a poetic allegory, a poetic reading of what essentially is a depiction problem, the picture plane. The landscape setting only enables a transcendent meaning that is already incorporated in the

D. Richard Buckminster Fuller
Dymaxion projection, 1946

form of the plan. "It holds that no single literal meaning can stand alone, but that a valid utterance must possess a transcendent meaning as well, a symbolic surplus beyond the literal level."⁵ A plan drawing can never be without literal description, but just as much will it never stand as purely that, its form of a drawing directly enables a second level.

THE PLAN AS DEVICE

In 1943, two years after the USA entered the second World War, Life magazine featured a photographic essay presenting a new form of projection of a World map, invented by Richard Buckminster Fuller, the Dymaxion Projection.



By projecting the planets surface onto the surface of an icosahedron, Fullers map represents the continents without distortion, as the spherical shape of the planet is approximated in a geometry rather than pictorially distorted.

Through the unfolding Fuller introduces a second, even more peculiar aspect to the representation, the planet loses its top and bottom, only different unfoldings of the icoshedron are used in order to emphasize different parts of the world. It was Fuller's view that given a way to visualize the whole planet with greater accuracy, we humans will be better equipped to address challenges as we face our common future aboard Spaceship Earth. The dymaxion projection therefore is not only an improvement in terms of accuracy of representation, but it stands as an emblem for a decentralized world order in the birth of globalization. It is a new form of plan as demanded by Le Corbusier, a plan that carries in its form of representation a new societal system: "The great problems of tomorrow, dictated by collective necessities, put the question of "plan" in a new form. Modern life demands, and is waiting for, a new kind of plan, both for the house and for the city"⁶.

More recently, nonrepresentational modes of planning and documentation are increasingly taking over architectural production due to rapid developments in CAD Processes. The dry-looking algebraization postulated by Le Corbusier has come to a stage where it turns into a pure numerization, where calculus replaces geometry in the phase of planning. As with Buckminster Fuller's Dymaxion map, accuracy in documentation of a place changes the mode of thinking about that place. The Dymaxion projection's democratic model of a globalized society is replaced by a model of adaptivity to concrete situations inside the social collective. The forms of planning and manufacturing based on numeric variability of plan allow for new methods of massproduction that include individualized variations. Parametric design builds on a framework of conditions which determines the generated geometry by the data given into the system, the concrete space of the building is not authored by the architect, but by his algorithms. This form of planning enables architecture to be in a direct coevolution with other subsystems of society, economy, politics, the mass media, science, as data collected from those can be immediately used in the design process. Le Corbusier's *Third Reminder* seems to already take into account this processual way of

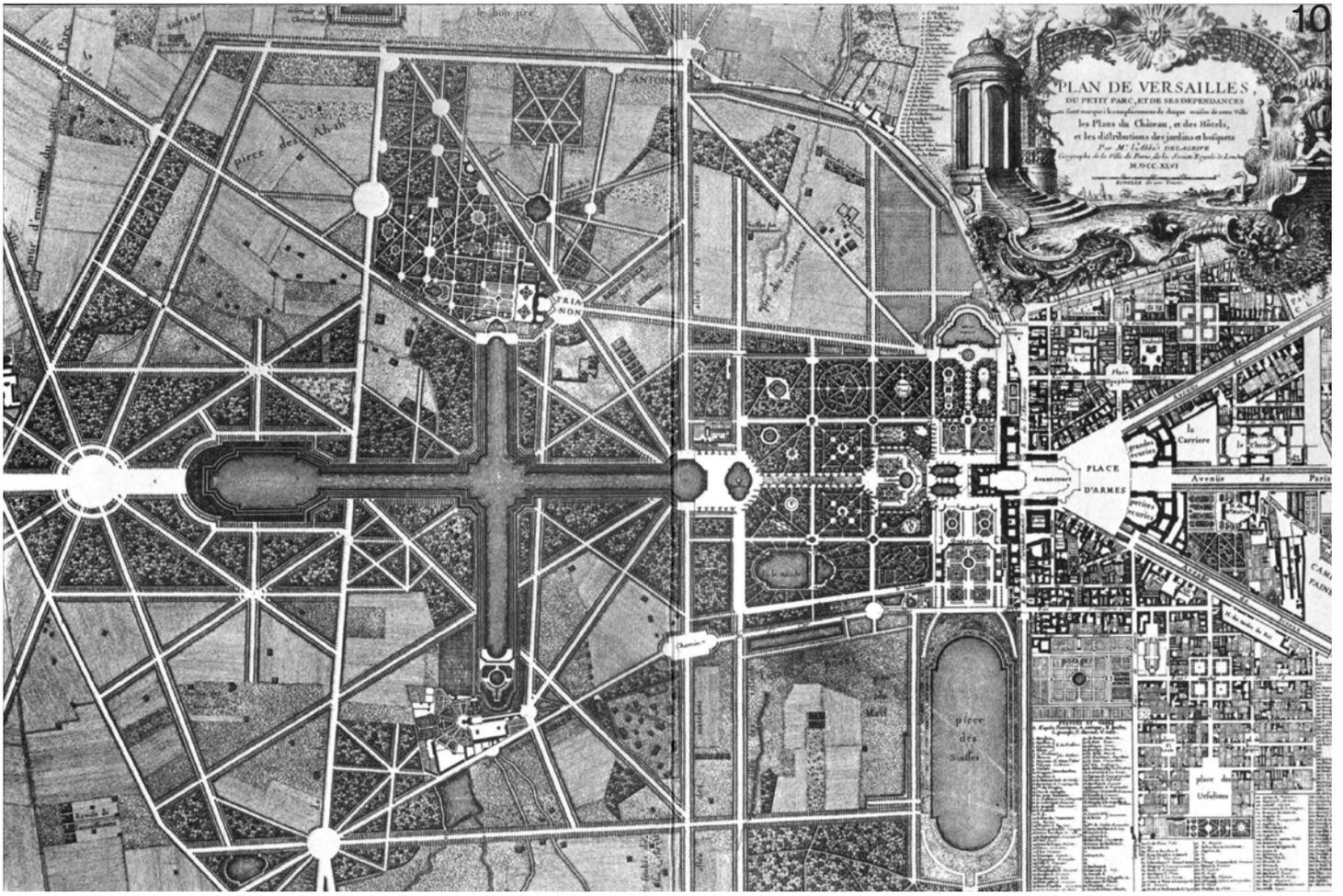
planning: “A plan is not a pretty thing to be drawn, like a Madonna face; it is an austere abstraction; it is nothing more than an algebrization and a dry-looking thing.”⁷

At the same time of a development towards an adaptive, nonrepresentational form of production, 3D visualizations and photomontages of buildings take over many of the presentational functions of plan. This, like any change in representational techniques also influences architectural thinking. The attention in representation is shifting towards a state in which the building is assessed primordially in regards to its actual built form, its appearance to a potential spectator. The completely virtual reality of the numerical plan faces a need for simulation of built reality, the experience of a space prevails its syntactical working. Coming back to the example of City of Glass, the concrete action dominates over possible idealistic conceptions. The place of the plan seems to change: it is no longer the plan of walls and spaces but it gets directly informed by a social reality. What gets lost in this process is what John Hejduk calls Architecture in the state of sleep, the plan: a virgin state of potential sensation, not spoiled by actual experience, in which it acquires an inevitability and timelessness.

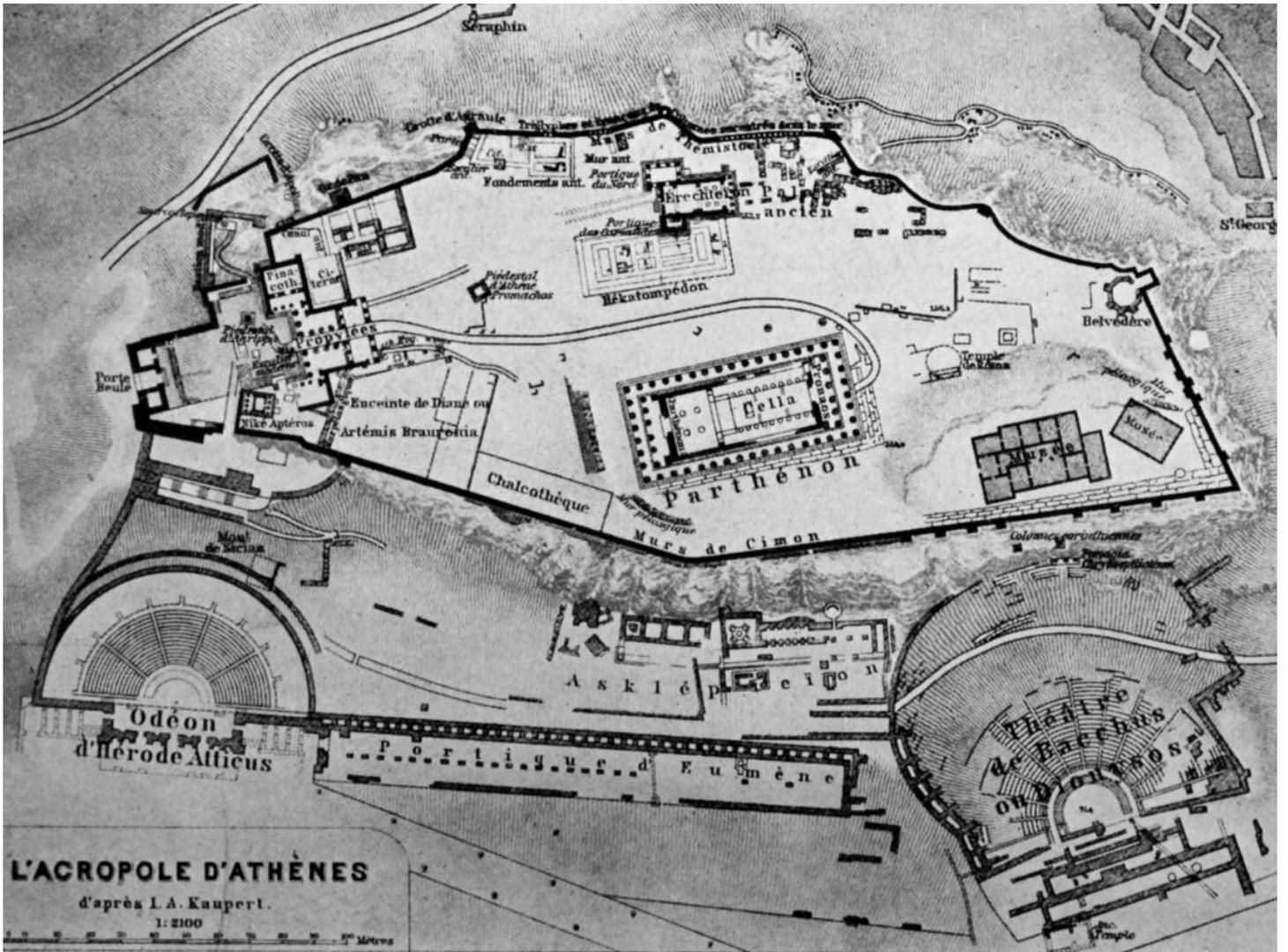
ILLUSION OF THE PLAN

Considering the plan as autonomous drawing we will see a network of thicker and thinner lines, textual annotations, geometrical or organic systems, a drawing determined not only by a spatial, but often even more a twodimensional logic inherent to drawing rather than building. The drawing develops parallelly to the idea of the building, ideas that are of high clarity in the drawing might not be experiencable as such in the executed space, reversely, a clear spatial configuration might not be understandable as such by the means of drawing. The comparison of two extremes, the gardens of the castle of Versailles and the Acropolis in Athens, can establish an exemple hereof. Whereas the Gardens of Versailles were developed in plan form, on reduced scale, the acropolis presents a configuration of buildings grown over a long period of time, developed largely without notational devices, and without masterplan.

E Versailles complete plan, Abbé Delagriffe, 1746



F Plan drawing of the Akropolis in Athens



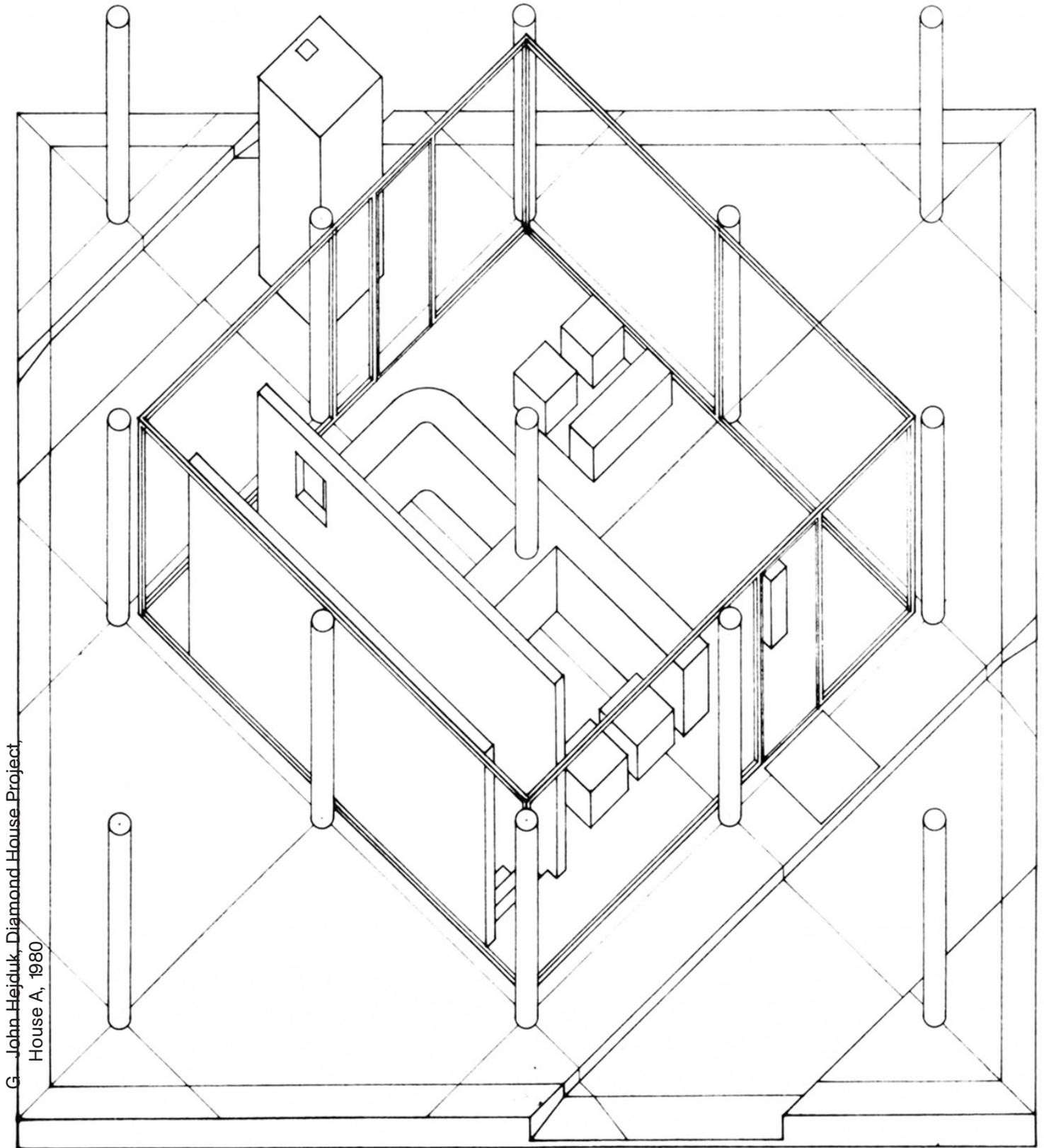
The plan of the Acropolis presents an organic accumulation, where a complex interplay of hierarchies, types, views and paths, aspects therefore of surface and mass, cannot be reduced to plan view, whereas in the case of Versailles, connections of different buildings, prominent, big, and less prominent, small, squares are of a clear organization in plan view, whereas the experience of the space is labyrinthical. The appearances of both plans as drawings, compositions of lines, create what Le Corbusier calls the Illusion of plan, the indexical relation of plan and place is distorted, the drawing and the experience of a space almost contradict each other. “Man sees architectural things with eyes that are 1 m 70 from the ground. We can reckon only with goals accessible to the eye, with intentions that take the elements of architecture into account. If we reckon with intentions that do not belong to the language of architecture, we end up with an illusionary plan; we break the rules of the plan through faulty conception or through a penchant for vain things”⁸

The illusion of plan can be extended to a wider field of language and syntax, from graphical to textual notation. In 1856 John Ruskin reacted to contemporary tendencies in poetry towards an overly ornamental and metaphoric writing, by introducing the term of pathetic fallacy. Pathetic in the sense of an empathic rendering of facts, which produces “a falseness in all our impressions of external things”⁹, by prescribing an emotional reaction for the reader, whereas the factual description of an event in the right syntax already provides the framework for evoking that reaction. The bare factuality of things already provokes metaphors and imagination by its particular structures. It is a highly abstract working of the mind, Architectural abstraction, that “while it is rooted in hard fact, (it) spiritualizes it”¹⁰.

A PROBLEM OF DEPICTION: THE IDEAL PLAN

From 1950 to 1960, John Hejduk established and thoroughly investigated the diamond house thesis. The thesis essentially is a depiction problem: A square in vertical orthographic projection turns into a diamond when depicted in axonometric projection, when it comes into (illusionary) space. In order

to depict a square space, one has to draw a diamond-shaped floorplan.



G. John Hejduk, Diamond House Project, House A, 1980

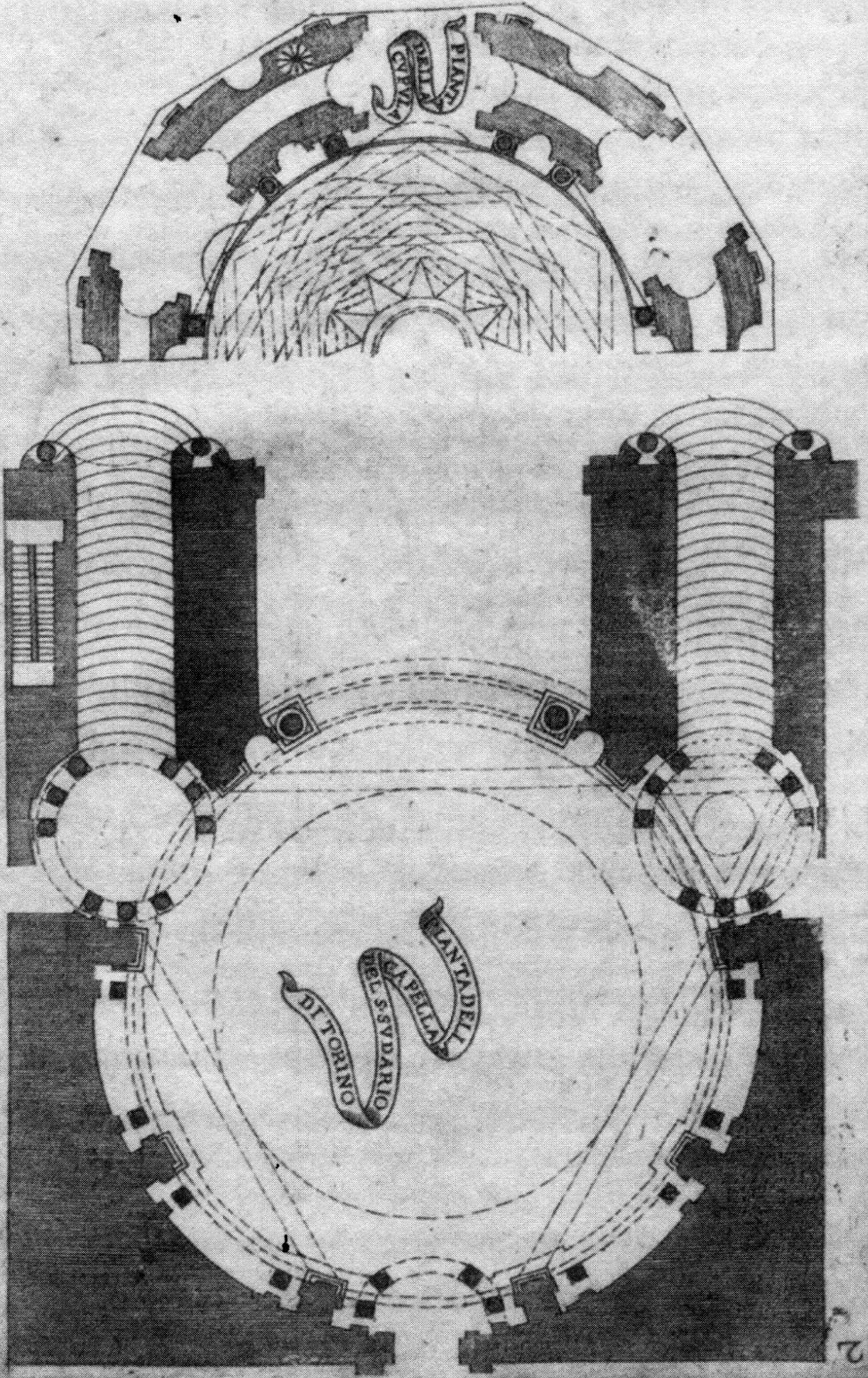
In reference to a potential building of the house (which was never executed), this problem seems to be largely irrelevant, as the building does not exist in the framework of representational conventions. If read as a reference to a building, the plan still would be able to describe the same distribution of spaces, but its real importance lies in its allegorical content.

While the diamond thesis is rooted in modernist ideals, remotely reaching as far back as to Andrea Palladio's Villa Rotonda, it enables a metaphor for a progressive movement away from modernism: "If the Cubist canvas provided thought to the architects of the twenties, there may be some significance in the diamond canvasses of Mondriaan for architects today."¹¹ The mode of planning, the form of the drawing, contains essential references to the position of a building in a cultural context. In the metaphor of Mondriaan's paintings Hejduk's strive for a pure architectonic expression coincides with his view that architecture is not defined by its constructed materialization. The diamond houses are at the very core of architectural thought, bare of figurative association. More than proposals for specific building projects they present a position of the architectural discipline, a broader model for rendering ideology in architectural creation.

WAYS OF READING

Whereas Hejduk consciously introduces metaphors in the planar development of an architectural idea, the intent of many plan drawings is a purely literal one, a working drawing for the instruction of craftsmen in the construction of a building. But the compression to a graphical format always enables a different, symbolical reading. As the planar surface renders most architectural elements into abstract signs, these signs take on a meaning different from their referent in the building. Unintentionally, plans invite for an overly metaphorical reading, creating an illusion of plan, where there is none, mere constructive devices can turn into supposedly meaningful elements. In the plan of Guarino Guarini's Chapel of the Holy Shroud, the center of the plan is occupied by a triangular shape. As it is a chapel, a metaphor of trinity is fast at hand, and was interpreted as such by many historians, but the triangle is merely a projection of the support construction of the cupola, which upon entering the chapel is not perceivable as tripartite structure, the space is dominated by the circular space of the cupola. The triangle only appears in the plan, but it does neither stand as an allegory of something external nor internal to the building, it is a mere constructive device.

H Guarino Guarini, plan of the Chapel of the holy shroud, Turin Cathedral. 1668-94

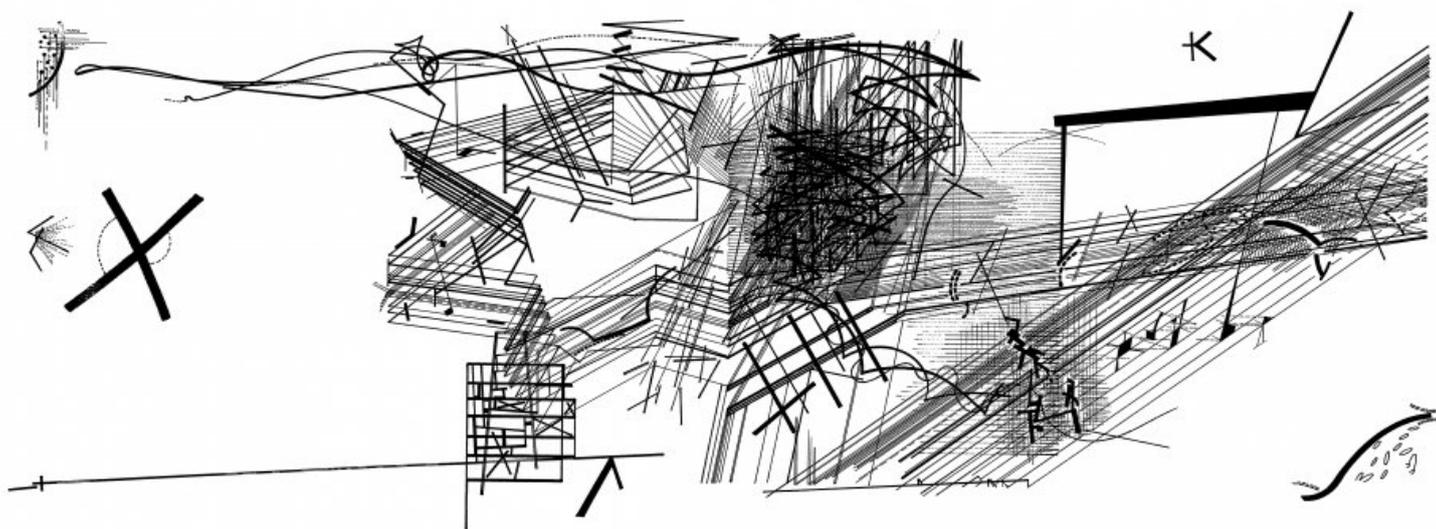


ASPECTS OF GRAPHIC ENCODING

“A plan is in some sense a concentrate like an analytical table of contents. In a form so concentrated that it seems like a crystal, like a geometric footprint, it contains an enormous quantity of ideas and driving intention.”¹²

Coding and Abstraction seem to be the two main means through which this concentration can occur and stay readable. The difference between the two processes lies in the directionality of their compression: whereas coding creates a parallel system based on a conventional agreement on the code (things can be coded as letters, even though they don't have any common aspects, therefore parallel), abstraction is a derivative procedure, meaning that the abstraction has an essential connection with what it abstracts, the abstraction creates a form that contains the abstracted, but not all its particular aspects. It goes toward the platonic idea of a thing, a diagram, as defined by Charles S. Peirce: “a diagram is an icon, which is part of an object or its property, and at the same time, is a sign, an operational system.”¹³ While they enable the translation of an architectural idea into a graphic form, the form of compression also contains a way of architectural thinking.

Daniel Libeskind's series of drawings, *Chamberworks*, carries in its title the notational character of the drawings, the form of their conception of space.



The title can be read in its original sense, as a type of musical composition, an arrangement for a small ensemble (a musicpiece, that can be performed in a chamber), but its literal composition out of Chamber and Work suggests an architectural study, a work on the theme of chambers. In what way are these plans plans, and how do they differ for example from the musical notations of Iannis Xenakis or Sylvano Bussotti?

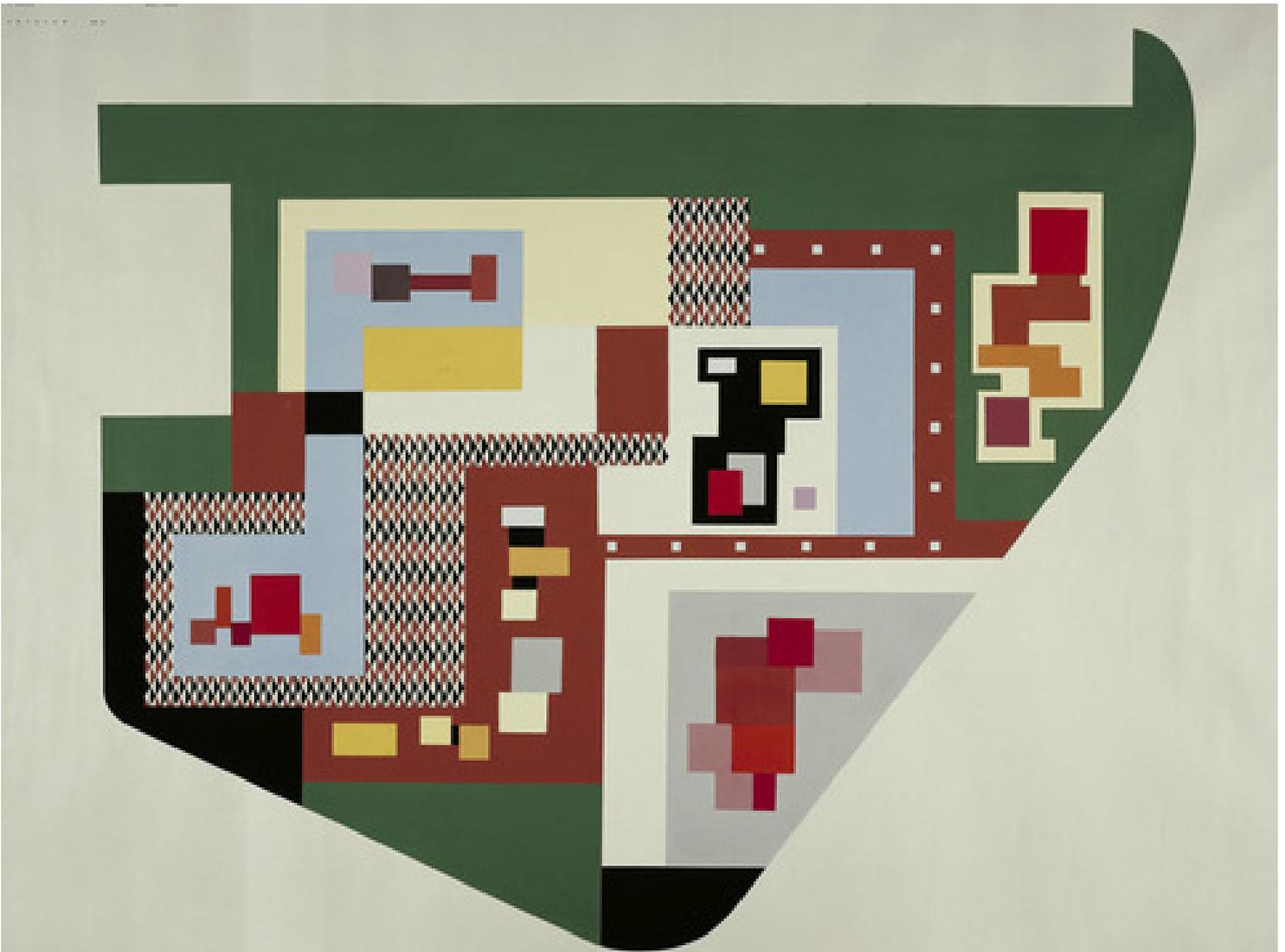
Es. 7. S. Bussotti, *Siciliano*.

The image displays a complex musical score for 'Siciliano' by Sylvano Bussotti. The score is characterized by its intricate notation, which includes traditional musical symbols such as notes, rests, and dynamic markings (e.g., *pppp*, *ff*, *p*, *mp*, *fpp*, *mf*). The notation is heavily layered and often overlaps, creating a dense and visually complex structure. A prominent feature is the use of architectural diagrams, including floor plans and perspective drawings of buildings, which are integrated into the musical notation. These diagrams are connected to the score by lines, suggesting a spatial or structural relationship between the music and the architecture. The score is written in a style that is both highly technical and highly expressive, reflecting Bussotti's unique approach to musical composition. The text at the bottom of the page reads: "il mare e che lunghi fiumi caldi raccoglie."

Libeskind's drawings look like musical notations, as they use certain graphical forms borrowed from that format, but they miss an essential element of the notations, which exists even in the more complex works of Xenakis or Bussotti, a clear system of reference (be it even the graph paper's markings), which enables a musician to read the score, transform it into sound. Libeskind's plans are out of scale, they use the forms of notation metaphorically. The notation is dysfunctional as a musical score, which again can serve as a plan for that space, many of Libeskind's built works seem to still carry a lot of the character of these early drawings in themselves. Without a referential system, the plan as a diagram is scaleless. The plan as working drawing though has its restraints in the level of non-abstracted description, as it is bound to a less-than-life scale.

The necessary abstraction in the compression of scale can be efficiently used for clarification and formulation of aspects of the architectural idea.

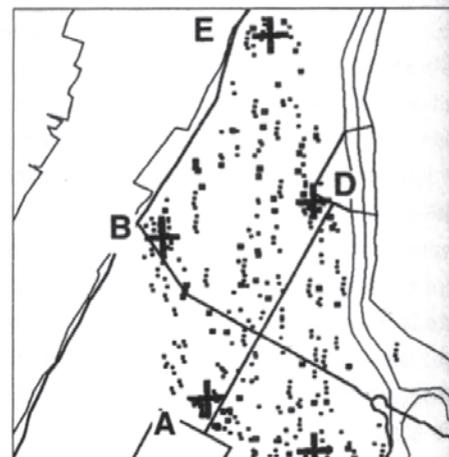
K Roberto Burle Marx. Ibirapuera Park,
Quadrifennial Gardens, project, São Paulo, 1953



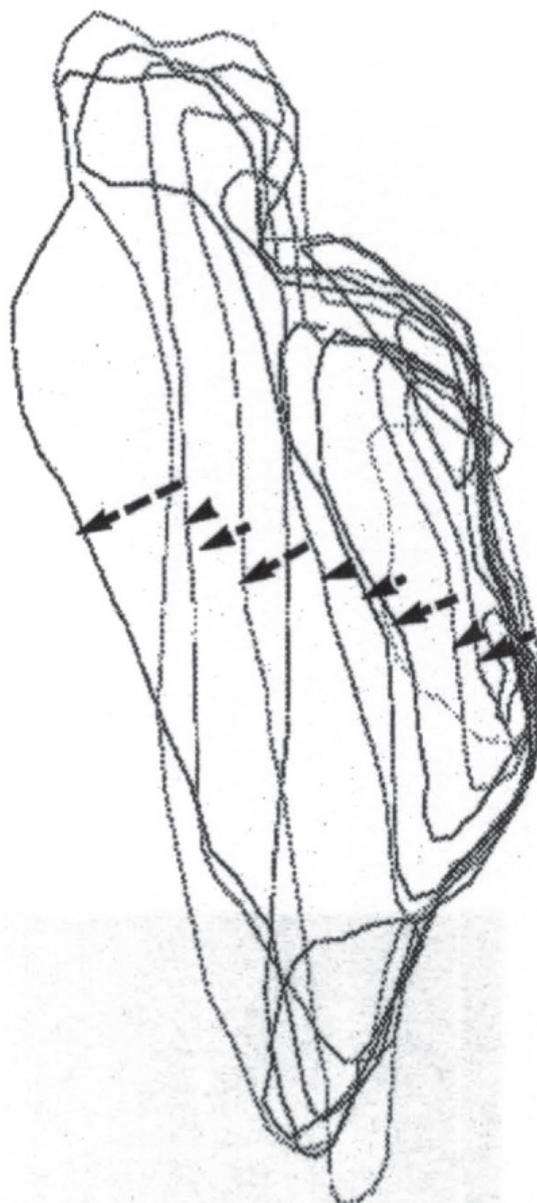
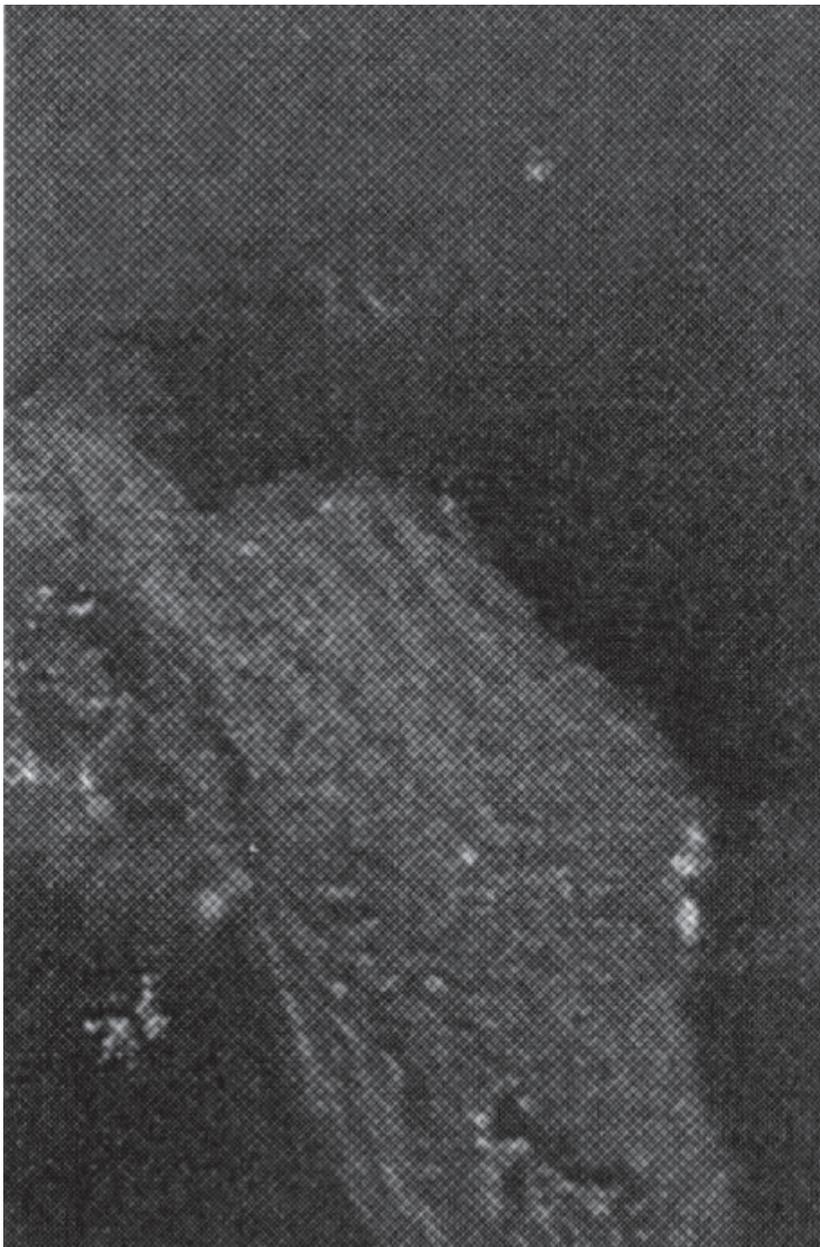
The garden plans of Roberto Burle-Marx are based on a colourcode, plantbeds of species are represented as coloured rectangles. In the necessary reduction of scale, all qualities of plants – height, growthstructure, leaves – are excluded, only the general colourimpression is left. The space created by the concrete reality of plants is read as a space of colour rather than e.g. line or mood. The plant is abstracted towards its characteristic of having colour, which lays the foundation for the garden design. The architectural plan equally takes part in the history of nonfigurative painting as it does in architecture.

SCALELESS DIAGRAM

The scale of plan can essentially be defined deliberately, which causes the drawing of a plan to basically function as a scaleless diagram. The same structural basis of a plan could describe a small house or a whole city, depending on the scale applied to it, or as in CHORA's Project Chelsea, processes or elements completely exterior to architecture or urbanism can by their translation into a diagram become the plan of a building or city.



CHORA in their own words have “developed a specialisation in the management of complex situations, in which multiple stakeholders with very different interests occupy a territory.”¹⁴ The Project Chelsea was a proposal for the possible settlement and revitalization of empty building lots in Harlem, developed by means of material modeling. The progressive decay of a stone in water serves as the basis of prediction and planning of demographic changes in an area covering twentyfive squarekilometers. Only through its graphical, twodimensional translation can this transformation happen.

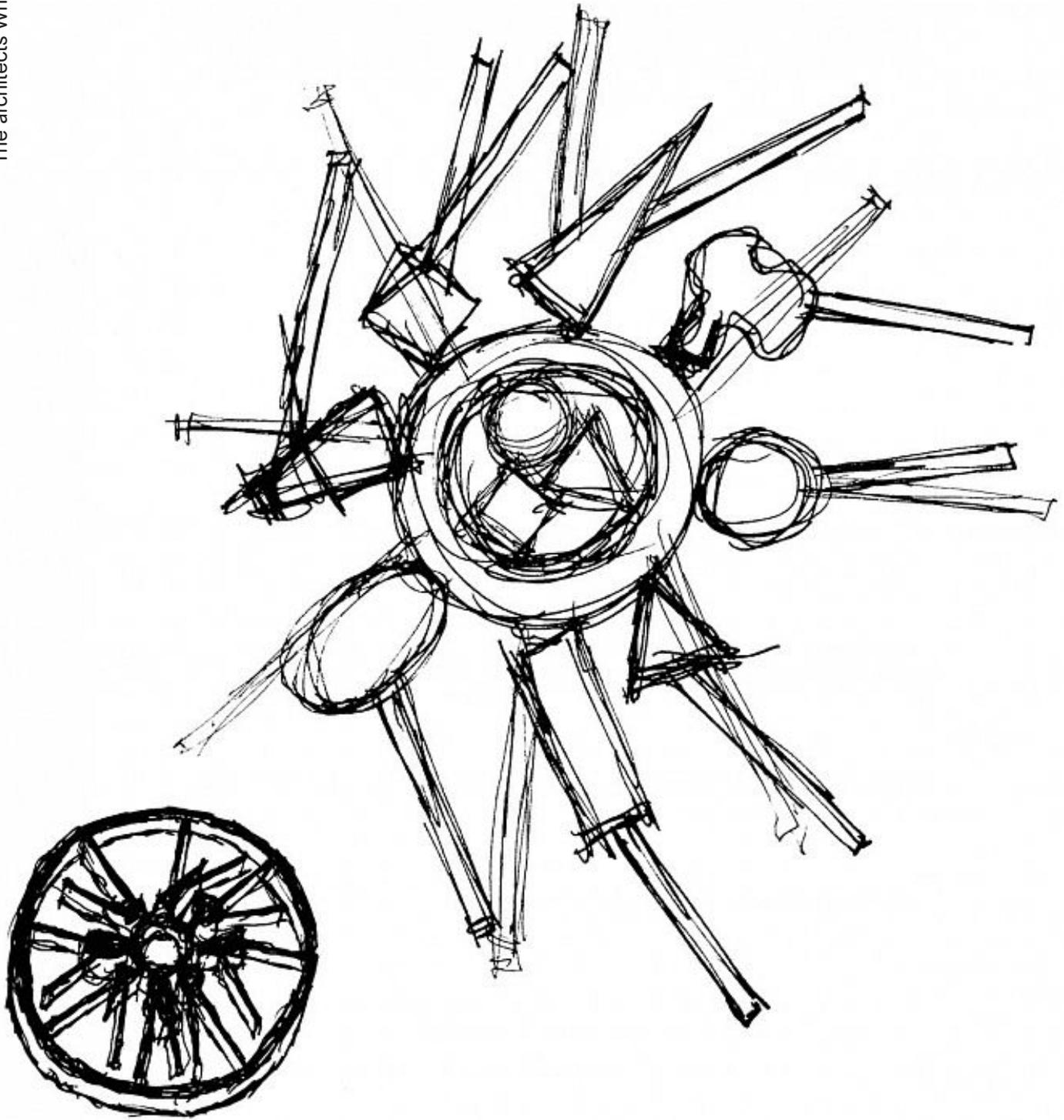


the plan in the end stands for neither of the two cases exclusively, it describes only a general form of growth, not so different from the earlier treated diamond houses by John Hejduk, which not only describe a potential reality of a building, but much more a model for architectural thought.

An even more drastic change in scale can be seen in an example from the artworld, in Man Ray's macrophotographies of dust on Duchamp's Large Glass. Documenting the large glass at a time short before its cleaning, they reveal an allegorical reading of the work. The sculptural aspects of the glass are concealed by two instances, by the layer of dust covering it, and the planar medium of photographic reproduction. Only structural differences in the surface of the glass are maintained in the layer of dust, the photographic reproduction



The photograph turns into a diagram, which still signifies the large glass but metaphorically turns it into a huge landscape, a pictorial setting. A word game reveals the key to the allegory: The french word for sheep, mouton, also names the accumulations of dust. The photograph starts suggesting the plan of a landscape inhabited by a herd of sheep. the lines in the background acquire scale through this reference, otherwise they could stand for a construction on any scale. Again, one 'text' is read through another, the planar format acquires a meaning on itself, though it is essentially bound to the depicted reality. The aim of the architectural plan drawing first of all seems to be to communicate the basic constitution of a place, but it acquires a place on itself. In its high degree of architectural abstraction it is an effective means for communicating architectural thought.



- | | | | | |
|---|-----------------|------------|-----------|---------------|
| 1 | Plan | Footing | Concrete | Gide |
| 2 | Section | Foundation | Wood | Proust |
| 3 | Elevation | Floor | Steel | Flaubert |
| 4 | Detail | Wall | Brick | Hawthorne |
| 5 | Perspective | Window | Stone | Hardy |
| 6 | Isometric | Door | Glass | Robbe-Grillet |
| 7 | Axonometric | Flue | Synthetic | Blanchot |
| 8 | Flat Projection | Roof | Earth | Mann |

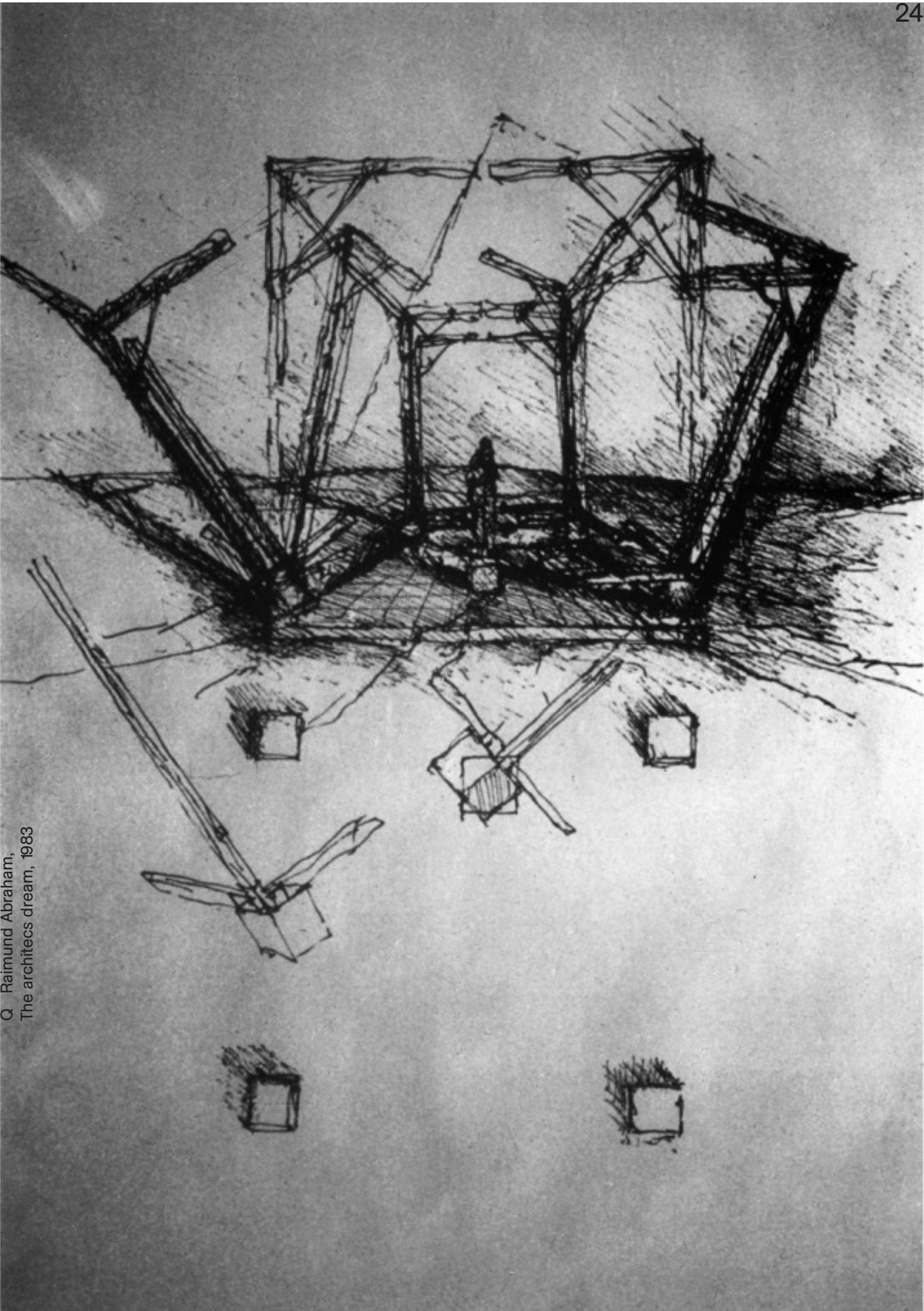
First and foremost architectural plans are a tool for instruction and documentation of a building process, but the graphic compression of a spatial idea creates a reality on its own. The plan equally takes part in other disciplines, painting, literature (think of Alain Robbe Grillet's *Jealousy*), as it does in architecture. The planar form of representation is able to develop architectural problems independent from the construction process. It writes a text, different from that of the building, though in an indexical relation they contain each other. The factual information given by the plan creates a metaphor of the building through decisions made in its form of graphical notation, the format of drawing enables architecture to incorporate and appropriate parts of other disciplines, literature, philosophy, painting. The foundations of visual literacy are different from those of architectural, spatial literacy. In John Hejduk's *Architects wheel* the history of literature stands on the same level of elemental necessity, as that of construction materials, forms of depiction and building elements. Still, a plan is bound to an indexical relation towards reality, but it narrates a different story about the building it depicts, just as the story of the building differs from that of the plan. In its abstraction, the plan creates a *Sinnbild*, ideograph, allegory of the building. The text formed from a logic of graphical signifiers, line, plane colour, typography, delineates what a building is about in a two-fold way: Syntactical, as the composition of spaces, and theoretical, as the *Weltanschauung*, a complex synthesis of philosophical, religious, social beliefs. In that sense, the *Architects wheel* is an archetypical plan, containing Hejduk's complete vocabulary, a model for his architecture, for the narrative of basic shape, rather than a concrete building. Every plan evokes the world in which that building exists, the possibility of a space, just like every lie creates the world in which it is true. The plan formulates principles of grammar, methods of thinking and working, it integrates tectonic space and form and human experiences and conditions that comprise our existence and thus it is essentially philosophic. "It was the precision of my memory which enabled me to demystify the imaginary quality of the dream: surreal and real became interchangeable metaphors."¹⁵

THE DREAM

In March of this year I experienced and recorded my first architectural dream. As my recollection of dreams has usually been vague, fragmentary and distorted, this particular dream left a precise and lasting imprint on my memory:

"A man who strongly resembled Jim Stirling, guided me toward, as he described it, a mysterious construction site. A soft and barren hill, detached from any recognizable geographic identity, revealed on its flattened top a square concrete slab, with sides approximately twelve feet long and raised one foot above the soil. Its surface was marked by an orthogonal grid, parallel to the sides of the square plane. Four cubes, approximately eighteen by eighteen by eighteen inches, were placed (one on each corner of the slab) to seemingly float above the surface of the square. Each steel cube was supported and connected by a steel joint, which functioned as a pin hinge, turning 180 degrees within a vertical plane, and as a vertical axle, turning 360 degrees within a horizontal plane with independent sockets in the cube as well as the slab. Each of the cubes was turned against the orthogonal sides of the slab and appeared slightly tilted along their vertical axis, as if to defy the accepted rules of gravity. The number of possible juxtapositions seemed infinite."

It was the precision of my memory which enabled me to demystify the imaginary quality of the dream: surreal and real became interchangeable metaphors.



Q Raimund Abraham,
The architects dream, 1983

TEXT

- 1 Le Corbusier, *Towards a New Architecture*, Dover Publications, 1985 p.26
- 2 Le Corbusier, *Towards a New Architecture*, Dover Publications, 1985 p. 26
- 3 Étienne-Louis Boullée, *Architecture: Essai sur l'art*, ed. Jean-Marie Pérouse de Montclos, Hermann, 1969 p.48
David Purdy, *On the ruins of Babel: architectural metaphor in German thought*, Cornell University Press, 2011 p.105
- 4 John Hejduk, *Adjusting Foundations*, Monacelli Press, 1995 p.48
- 5 Richard Valantasis, *The Gospels and Christian Life in History and Practice*, Rowman & Littlefield Publishers, 2009 p.47
- 6 Le Corbusier, *Towards a New Architecture*, Dover Publications 1985 p. 45
- 7 Le Corbusier, *Towards a New Architecture*, Dover Publications, 1985 p. 48 – p.49
- 8 Le Corbusier, *Towards a New Architecture*, Dover Publications, 1985 p.177
- 9 John Ruskin, *Modern Painters*, 1856 Volume III, part IV, chapter XII
- 10 Le Corbusier, *Towards a New Architecture*, Dover Publications, 1985 p.26
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- 12 Le Corbusier, *Towards a New Architecture*, Dover Publications, 1985 p. 177
- 13 Charles S. Peirce, *Logic as semiotic: The theory of signs*, in Charles Sanders Peirce, *Philosophical Writings*. Dover, 1902

- 14 <http://www.chora.org/?p=73>
- 15 Raimund Abraham, *the architects dream*, 1983, <http://lebbeuswoods.wordpress.com/2010/02/14/raimund-abrahams-dream/>

IMAGE

- A <http://plusacne.org/2013/03/05/roma-interrotta/>
- B John Hejduk, *Adjusting Foundations*, Monacelli Press, 1995
- C https://smartech.gatech.edu/jspui/bitstream/1853/36608/1/he_weiling_200505_phd.pdf
- D <http://www.genekeyes.com/FULLER/BF-3-1944.html>
- E http://commons.wikimedia.org/wiki/File:Plan_de_Versailles_-_Gesamtplan_von_Delagrife_1746.jpg
- F <http://www.bible-history.com/ibh/Greek^Monuments/Acropolis/Plan^of^the^Acropolis^of^Athens>
- G <http://akingwithoutacrown.tumblr.com/>
- H Guarino Guarini, *plan of the Chapel of the holy shroud, Turin Cathedral. 1668-94*, OASE Magazin 86
- I <http://dibujoetsamadrid.wordpress.com/2012/03/02/daniel-libeskin-bn-bicolor/>
- J http://www.sinfoniavirtual.com/revista/005/grafismo_musical_frontera_lenguajes_artisticos.php
- K http://www.moma.org/collection/object.php?object_id=286
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