

The Parameters of the Figure: Drawing as a Diagram of Figural Forces

Fabrizio Gay

The drawings preserved in the Moretti-Magnifico Archive reveal an approach to architectural design based both on the evocation of mythical buildings and on the calculation of precise functional parameters. The three preparatory sketches for the Imperial Theatre at E42, made by Luigi Moretti in 1937 and published here, are merely rough drafts of a solution later discarded: private notes, rapid and fragmentary, yet revealing of Moretti's method, which uses drawing as a diagram of forces to record the interweaving of structural, spatial, and perceptual tensions within which the project develops. In particular, the sketches on the letterhead sheet reflecting on visual angles within the theatre cavea seem to anticipate the principles of 'parametric architecture' that Moretti would fully develop in 1960 at the *XII Triennale di Milano*, where curves of 'equal visual appetibility' defined

the (almost naturalistic) shapes of 'ideal cavea' surfaces depending on various sporting events, specifically calculated according to geometric parameters of optimal visibility for every spectator.

The three 1937 sketches certainly do not outline the extremely clear teleonomic shapes and fully optimized caveas of 1960. They are freehand notes in which trajectories of force lines attempt to define an 'architectural figure', seeking to articulate some aspect of a parametric structuring that embraces both functional aspects and iconic or symbolic evocations. Even though these sketches outline a design solution later abandoned, they reveal figurative pregnancies (archaeological figures and modern issues of structure, visibility, and spatial organization) meant to measure the geometric and perceptual reasons of the cavea. With these diagrams, Moretti attempts to

This article was written upon invitation to frame the topic, not submitted to anonymous review, published under the editorial director's responsibility.

translate an 'ideal structure' into signs: a system of efficient relations between constructive constraints and evoked images, balancing building tradition and technical innovation, abstraction and figurality, construction and the sculptural plasticity of architecture.

This kind of diagram belongs to the broad genre of morphological figuration that follows, above all, a Renaissance tradition founded on Drawing understood as a tool to reveal the *Eidos* of things: the internal laws that define their form and the morphogenetic forces that generate them: namely, i) mereological relations (of a plastic or abstract nature, between parts and whole) and ii) analogies (of an iconic or figurative nature) among different forms. In this sense, Drawing does not merely depict but reveals the constitutive principles of artefacts, understood as aesthetic and structured organisms.

Moretti's sketches, however, are not among the most accomplished examples of this techno-artistic genre of morphological representation. The most renowned emblems of this 'morphological' genre are the anatomical and constructive drawings of Leonardo, Michelangelo, Borromini, Goethe, D'Arcy Thompson, and Haeckel, which have become exempla of visual synthesis describing the generative mechanisms of the depicted forms and structures: true icons in the history of scientific and artistic representation with a profound and lasting cultural impact.

What matters, in Moretti's case, is not the visual appeal of his drawings; rather, it is the comparison between the qualities of his drawing and those of his built architecture. From this point of view, the theoretical Moretti clearly expresses his adherence to the tradition of 'morphology' introduced by Johann Wolfgang Goethe [Goethe 1817-1824] and developed by D'Arcy Wentworth Thompson in *On Growth and Form* [1917]. In his method of analyzing and prefiguring architectural artifacts, expounded between 1950 and 1953 in the seven issues of the journal *Spazio, Rassegna delle Arti e dell'Architettura*, in the exhibition on parametric architecture at the *XII Triennale di Milano* (1960), and in the essays *Strutture di insieme* [Moretti 1963] and *Le serie di strutture generalizzate di Borromini* [Moretti 1964], two fundamental bibliographical references emerge: i) *Search for Form* by Eliel Saarinen [1948] and ii) *Aspects of Form*, the famous volume edited by Lancelot Law Whyte [1951], which brings together interdisciplinary contributions to the science of form, including Rudolf Arnheim's work on the psychology of

visual perception and Konrad Lorenz's on the ethology of visual perception. In the second essay that Whyte published in that volume, he introduces the concept of 'structure as form', a concept Moretti adopts verbatim in his similarly titled essay published (originally in French) in 1954 [Moretti 1954].

In *Structure comme forme* Moretti develops a fundamental distinction between practical structure (understood as the constructive and material component of architecture) and 'ideal structure' (the conceptual and spatial vision constituting its intellectual and poetic expression).

The way Moretti defines 'ideal structure' refers to a specific aspect of contemporary scientific morphology: the study of the 'qualities of forms'.

The 'expressive qualities of forms' are the properties of objects or events that convey perceptual, emotional, or symbolic meanings, at least in the sense understood in the phenomenological psychology of perception: from *Gestalt* theory to the early cognitive studies of naïve physics.

Moretti assimilates and reworks key concepts from contemporary psychological research to define an architecture that operates on three interconnected levels:

- rational (structure), adopting *Gestalt* principles of perceptual organization, particularly the theory of good form, reinterpreting them dynamically and sequentially according to Auguste Choisy's teaching on architectural space as a temporal experience;
- perceptual (light and space), integrating early theories of cognitive psychology (particularly the idea of an active process in constructing perceptual reality) to articulate the spatial sequentiality of built environments, anticipating themes that would become central to architectural phenomenology;
- symbolic (archetypes), investigating cultural stereotypes (according to contemporary social psychology) in search of universal figures, in an attempt to reconcile historical specificity with the timeless value of form.

Moretti's originality also lies in relating these psychological dimensions of form to the postwar developments of operational research in mathematics, originally created to solve logistical and strategic problems and already applied to architecture to optimize shapes and structures through rule-based methods. Between the 1950s and 1970s, mathematical modeling provided generative tools that anticipated today's computational

design, in which algorithms and parameters guide form. In this context, the diagram becomes the common language of an epistemological transition: from the building as a finished object to construction as a multi-dimensional morphogenetic system. Christopher Alexander gained great influence with *Notes on the Synthesis of Form* [1964], theorizing design through hierarchies of diagrams of functional requirements and introducing 'Tree diagrams' and 'Force diagrams' to map conflicts between social and structural demands. During the same period, Frei Otto, Buckminster Fuller, and Sergio Musmeci developed radical morphogenetic methods in which form emerges from physical laws, systemic geometries, or tensile equilibria rather than from compositional arbitrariness.

Otto, for example, used physical models –soap bubbles or stretched nets– to generate minimally energetic forms, later tracing diagrams ('force flow diagrams') to visualize load paths and points of tension on membranes and shells. This method, based on observing natural tensile equilibria, has deep historical roots. Already Robert Hooke (17th century) had demonstrated that the shape of a perfect compression arch corresponds to the configuration of a hanging chain, a principle later formalized by Johann Bernoulli and Giovanni Poleni and, in the 19th century, experimented with by Antoni Gaudí through inverted funicular models to determine the geometries of the Sagrada Família. In the twentieth century, Heinz Isler and Musmeci experimented respectively with deformed fabrics and elastic rubber models to optimize shells and bridges.

In the 1930s and 1940s, the experimental study of force configurations through stressed physical models was practiced in Italy. While designing Project A for the Palazzo del Littorio competition (1934) –in which Moretti also participated– Giuseppe Terragni, Pietro Lingeri, and Luigi Vietti employed transparent celluloid sheets to visualize isostatic lines and determine the optimal arrangement of metal staples within the large wall of Project A. Similarly, Pier Luigi Nervi used comparable methods to optimize reinforced concrete structures based on the actual distribution of forces, while Eduardo Torroja in Spain experimented with plaster models for his thin shells. These techniques, based on direct analysis of tensions, share the idea that structural form derives from the equilibrium of forces, anticipating modern approaches to form-finding.

Yet Moretti's aesthetics differ radically from the engineering approaches of Fuller, Otto, and Musmeci. Whereas these pursue a teleonomic logic in which form is primarily determined by physical objectives, Moretti integrates a deeply figural dimension, derived from Greek and Baroque architecture, into a system in which structure, perception and symbol merge. His drawings contain not only the early traces of parametric architecture but also the evocation of archetypes such as the Pergamon Altar (2nd century B.C.), in a summit-like and acropolis-like structure where sculpture and architecture fuse into a spatial and narrative system. It is a figurality that rejects easy iconisms, as suggested by the annotation "*forma nuda*" in one of the sketches, where Moretti tends toward a structure stripped of ornament, reduced to its 'figural' essence.

The term 'figural' originates in Husserlian phenomenology, where it denotes the moment in which a multiplicity presents itself as a perceptual unity before being classified. In Freudian theory, it designates the condensation of different meanings into a single form. Jean-François Lyotard, in *Discours, figure* [1971], defines it as that level of imagination in which the object is neither yet figure nor pure form, but a diagram of pregnancies that may propagate into semantically distant saliences. For Moretti, the figural is the structure of forces, tensions, and pregnancies that precedes the categorization into 'abstract' or 'figurative': it is the emergence of form as a field of expressive potentialities, even before it appears as a recognizable (iconic) object or pure geometry (plastic). Similarly, in Freudian dream theory the 'figural' denotes the way in which different meanings and affordances condense into the same perceived form (e.g., a staircase may 'express' ascent, effort, mystery etc.).

Moretti's drawings sometimes exemplify precisely a graphic technique of 'condensation' (in the Freudian sense): they present an idea more than represent it; they open a parametric inquiry that seeks to reveal the generative forces of form. His originality lies in uniting morphological tradition, psychology of perception, and operational mathematical research to create an architecture that transcends the dichotomy between abstract and figurative, proposing a mythological (figural) vision of architectural form.

This raises a broad question: to what extent can contemporary digital technologies, though capable of unprecedented formal optimization, capture the figural

complexity that Moretti explored through traditional graphic drawing, with gestures integrating morphological tradition, perception, and symbol into a meaningful unity? How, today, can we explore that same complexity within an ecosystem of Artificial Drawing, where generative

intelligence not only parametrizes forms but redefines the very parameters of meaning—between cultural memory, perceptual experience, and invention— in a co-authorial dynamic of interaction between human design and algorithmic elaboration?

Author

Fabrizio Gay, Dipartimento di Culture del Progetto, Università Iuav di Venezia, fabrizio@iuav.it

Reference List

Alexander, C. (1964). *Notes on the Synthesis of Form*. Cambridge: Harvard University Press.

Goethe J.W. (1817-1824). *Zur Naturwissenschaft überhaupt, besonders zur Morphologie*. 2 Bände. Stuttgart-Tübingen: J.G. Cotta'scher Verlag.

Lyotard, J.-F. (1971). *Discours, figure*. Paris: Éditions Klincksieck.

Moretti, L.W. (1951). Struttura come forma. In *Spazio. Rassegna delle Arti e dell'Architettura*, n. 6, pp. 21-30.

Moretti, L.W. (1957). Forma come struttura. In *Spazio. Rassegna delle Arti e dell'Architettura*, special monographic issue.

Moretti, L.W. (1963). Strutture di insiemi. In *Spazio. Rassegna delle Arti e dell'Architettura*, special monographic issue (subsequently published as: (1964). Strutture d'insiemi. In Moretti, L., Tapié, M., Bayl, F. *Musée-Manifeste. Structures et Styles autres*. Torino: edizioni Fratelli Pozzo).

Saarinen, E. (1948). *Search for Form. A Fundamental Approach to Art*. New York: Reinhold Publishing Corporation. <<https://dn721704.ca.archive.org/0/items/searchfun00saar/searchfun00saar.pdf>> (accessed 20 December 2025).

Thompson, D'A.W. (1917). *On Growth and Form*. Cambridge: Cambridge University Press.

Whyte, L.L. (1951). *Aspects of form. A Symposium on Forms in Nature and Art*. New York: Pellegrini & Cudahy.