THE FOURTH REGISTER OF ARCHITECTURE: ‘MODEL AS...’

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INTRODUCTION

ABSTRACT

The model has been largely overlooked in architectural discourse to date and has historically been overshadowed by drawing in both academia and practice. Alberti's theories[1] augmented Pre-Renaissance conceptions of the model, representing a defining shift in model thinking that still seems pertinent today. He saw the model as a conceptual device for the architect rather than an illustrative tool to present to the patron.

This thesis investigates how the physical architectural model might be considered an important component in the architect's toolbox with the ability to iteratively inform design. Exploring the role of the model will not only help us understand its value beyond a purely descriptive object surrogate for the proposed building, but will also enable us to critically analyse the model's existence as the physical embodiment of something as intangible as a concept, and in its essence as a catalytic design tool.

INTRODUCTION:

Introducing the Physical Architectural Model

Fig.01: Denys Lasdun's discarded National Theatre models.

Fig.02: Soane Museum model archives.

0.1 Why the Architectural Model?

'Architecture is produced in three different registers, through three different texts: drawing, writing and building.'[2]

Diana Agrest footnotes this assertion with *'we could count four, if we consider models.'*

Academics and architects often disregard physical models, instead we tend to relegate them to footnotes. Models might dominate architectural education, competition submissions and permeate aspects of practice, but they do not dominate the discourse, they footnote it. Numerous studies have investigated the architectural model during Renaissance and Baroque periods, but the value of the contemporary model, as a design tool and form of representation, has received little scholarly attention to date. Here, the intention is to extend that footnote, arguing that *'models need not merely describe a project'* but have the potential to generate it.[3]

While architectural photography and drawing has been the subject of countless exhibitions and publications, no comparable research on the significance of the architectural model has seemingly been undertaken. It is not to say that models are not commonplace within the profession today, but their potential is often overlooked. The two-dimensional architectural drawing is compact: easy to display and archive. But the model is less so, its physicality and bulk seemingly inconvenient. This physical presence of the scale-model is precisely what defines it and sets it apart from other, more notational forms of architectural representation. Architecture can manifest itself through other forms of representation which are no less valuable to the discourse. However, it can be argued that the model is as valid as the built outcome it usually precedes and the completed building need not exist as the purest form of Architecture as it is commonly perceived.

This research substantiates the importance of the physical model and sets out the digital model as a separate concern, rejecting the assumption that it supersedes the traditional architectural model. Only recently are we beginning to see the recovery of the model from the archives, with organisations such as the Sir John Soane Museum reinstating the architect's *Model Room* this year, 160 years after curatorial offices displaced it following Soane's death in 1837 (Figs.02-03). Similarly Christopher Wren's models, including his *Great Model* of St Paul's Cathedral, currently viewable by appointment only, are soon to be publicly exhibited once more (Figs.04-06). Through scrutinising the architectural model and advocating it as more than just a medium of architectural expression, we intend to reinstate the model as a fundamental contributor to architectural design.

Fig.03: Photograph of models in the Soane archives.

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Figs.04-06: Images of Wren's Great Model (1674) of St Paul's Cathedral.

0.2 Defining the Architectural Model

To define the physical architectural model, the small-scale artefacts typically littering architects' studios, we will begin with a more generic definition of *the model:*

1. A three-dimensional representation of a thing or proposed structure, typically on a smaller scale than the original.
2. A thing used as an example to imitate.[4]

Models are by no means unique to architecture; they are employed by external disciplines, most commonly in engineering and the arts. However, the architectural model distinguishes itself by testing concept, language and making scaled assessments of spatial and physical (architectural) compositions. Typically engineering models are preoccupied with structural and environmental prototyping, whilst the model in art can be loosely defined as a three-dimensional expression of a cerebral condition.

One virtue of the architectural model is this ability to transcend fields of production, such as prototyping or art. It is not limited by defined parameters; it can be an artefact demonstrating great precision or representing intangible conceptions of the imagination.

The model, as architects understand it, was principally a Renaissance invention.[5] Leon Battista Alberti (1404-1472) '*was the earliest…and most forceful advocate of the notion of the model*' not just as a medium of architectural representation, but as a design tool which led the architect on a journey of discovery.[6]

0.3 Five Essays: 'Model as...'

This thesis will begin with an historical account of the model, followed by five non-sequential essay booklets exploring distinct ways in which the model is conceived: *Model as Object* addresses the effects of scale and the fetishisation of the miniature; *Model as Idea* sets out the model as the utopic embodiment of concept; *Model as Building* focuses on the physicality of the making process; *Model as Image* considers the legacy of the model through photography; and *Building as Model* concludes with a discussion on the essence of Architecture as more nuanced than the production of buildings through the other registers, and posits *the model* as the Fourth Register of Architecture.

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THE ARCHITECTURAL MODEL:
A SHORT HISTORY

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CHAPTER ONE:

Contextualising the Architectural Model

1.0 The Architectural Model: A Short History

Through a synoptic overview, this chapter aims to contextualise the model focusing on three carefully selected historical periods during which changes in model thinking had some of the largest implications on the model attitude within education and practice: The European Renaissance (14-17th Century), The Académie des Beaux-Arts (1795-1968) and The Bauhaus (1919-1933). These key periods are not all encompassing, but offer insight into how the physical model as we understand it today emerged. The Renaissance is considered important as it is the period often accredited with establishing the architectural model as a representational tool to articulate the proposed design and test structural configurations and scale-prototypes (Fig.11). The influential Académie des Beaux-Arts saw the fastidious rejection of the model in education and subsequently the professional realm. A fixation on architectural drawing during this period resulted in the model's exclusion from the elitist academic curriculum as a preoccupation of the non-professional. Lastly, we turn to the Bauhaus school which saw the reinstatement of the relationship between designer and craftsman and revival of the model in education. The Bauhaus style later became one of the most influential currents in Modernist architecture and architectural education with architects such as Le Corbusier and Mies van der Rohe designing through modelling.

Despite models being cultural symbols and offering a record of architecture older than the profession itself, there is still confusion about when they were first used.

Artefacts resembling models have been uncovered in Egyptian burial tombs (Figs.08-09), representing model visions of the afterlife. Clay funerary-pots have been unearthed from archaeological sites across Greece. Burial jewellery depicting stepped pyramids and porticoes can

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Fig.07: Soane model archives.

Fig.08: Cave painting of man with stick.

Figs.09-10: Egyptian funerary models presenting visions for the afterlife ca. 1975 B.C

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Fig.11: Michaelangelo's working models of St Peter's dome
ca.1580.

be traced back to extinct cultures in the Americas. The Middle Ages' post-factum models were made following the building completion as a memorial to its erection.[7] However, whether these are models in the architectural sense, rather than symbolic objects, is debatable.

1.1 From Renaissance to Bauhaus

'Long ago, before anyone built their first dwelling, there lived a very intelligent human. One day, the human was walking in the woods and found a marvellous stick...The stick was a tool, and a most prized possession...the human arrived in a large clearing...Not finding a tree against which to lean the stick, the human [drove] it directly into the ground. All day long the human watched the shadow of the stick change. The stick…presented a better way of understanding the sun, creating questions about a vast, chaotic universe. It changed from a tool into a scaling-machine and seemed to encourage the measure of things.'[8]

As is demonstrated in Chapter Three, Albert Smith's hypothetical stick (fig.08), a thinking mechanism that catalyses our imagination, can be considered a proto-model. The relationship of the man to the stick is the same architects maintain with models today in practice, so we can

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Fig.12: '*Michelangelo shows Pope Paul IV the model of St. Peter's' Dome*', Painting by Cresti, 1620.

speculate that architectural models, or objects to their effect, were part of human culture long before they were recognised as an architectural tool. The scale-model is referenced in classical texts, with Herodotus referring to ancient models used in the Spartan occupation of Athens, and later by Vasari and Brunelleschi. However, the model as architects understand it was primarily a Renaissance invention.

The architectural drawing, not the model, was the focus of the discourse during The Renaissance. Drawings were the means of demonstrating architectural intent and were considered the special domain of the architect. But that was not to say models did not play their part. *'As drawings were codified as abstract representations, models could more easily convey a design to patrons and craftspeople...Models, therefore... played a supporting role to drawings conceptually.'*[9]

In the 1450s, Alberti was the earliest and most forceful advocate of the model as a design tool, emphasising the notion of the model's purpose beyond architectural representation. To him the model was '*the primary vehicle of design.*'[10] Establishing the model as conceptual device, rather than simply an instrument of representation for the client, marked a

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Fig.13: L. Alberti 1404-1472

defining shift in model thinking. For Alberti, the appeal of the model also rested in its ability to be reworked and amended in ways which drawings could not.[11]

Although little evidence survives of the Renaissance model being employed as Alberti intended, there are impressive examples of representational models and scale-prototypes. The significance of the model is demonstrated in Cresti's 1620 painting (Fig.12). Here we clearly see the architect using the model to promote and communicate the proposed design for St. Peter's. Michelangelo also produced a series of 1:12 and 1:24 and wooden sectional models of the cupola (Fig.11), constructed to test the dome's double-curvatures. The great Renaissance architects often fabricated fragment models at full-scale, particularly those of repeating architectural elements, such as Bernini's 1:1 prototypes for the colonnades of St. Peter's Square.

The physical model, as a mode of representation and testing, assumed an essential position within the discourse during the long span of the Renaissance, however the Albertian three-dimensional design process was not fully realised for centuries to come: surviving late-Renaissance and Baroque models often drift toward the polished and rhetorical. Drawing, particularly the perspective, displaced models as the favoured mode of architectural representation. This was largely a consequence of the erosion of the model's prestige under the influence of the Académie des Beaux-Arts.

The Beaux-Arts ethos followed the Renaissance as the cumulative product of two-and-a-half centuries of education under the authority of Académie Royale d'Architecture (1671-1793), then, following the French Revolution, of Académie des Beaux-Arts (1795-).

For some two-hundred years the Academy filtrated architectural education. Set up in opposition to guilds, its intention was to *'elevate certain professions – architects, sculptors and painters – from craftsmen to philosophers based on idealised Renaissance academies.'*[12] As the school began to define the professional architect, a distinction between the architect and craftsman became evident: *'The professional did not get his hands dirty…and divorced himself from model-making. The architecture studio resembled a painting studio, a world of two-dimensional representation.'*[13]

The notion that models were not the preoccupation of the architect stemmed from the preceding Renaissance emphasis on pairing the architect with his drawing, which endorsed the notion of design as a pure idea which should be committed to paper. Contrastingly, modelling was associated with *la maquette*,[14] a method accentuated elsewhere within the Academy. The professional elitism of the virtuoso architectural drawing overshadowed the model, deeming the latter largely redundant not just within the Academy. This Beaux-Arts ideology became incredibly influential and was osmotically adopted in education and practice across the Western world.[15]

In the years following WWI the Academy had influence worldwide over the architectural discipline, one which still lingers today. Concurrently, the newly founded Weimar Republic saw the emergence of the Bauhaus (*House of Building*), founded by Walter Gropius, which rebelled against the remoteness of designing through drawing from real Architecture. *'The model was there from the start as part of the Bauhaus manifesto'* in 1919.[16] The Bauhaus was to situate itself in opposition to the Parisian Academy and would see the model regaining popularity, its revolutionary curriculum hoping to *'resurrect the medieval 'lost chord' between designer and craftsman.'*[17] The Vorkus foundation course was a unique syllabus interested in educating all incoming students of arts and architecture in the fundamentals of design. The course emphasised the importance of creative handcraft and specifically the model as *'a vehicle for pure creativity.'*[18]

The Bauhaus withered with the rise of the highly repressive National Socialist Party, and was forced to close completely in 1933. Despite surviving just fourteen years, the it is often cited as the most important and influential design school of the twentieth century.[19] Its pedagogic position had a major impact on art and architecture most noticeably in Western Europe and the United States, in the decades following its demise and, as Gropius intended, reinstated the association between designer and maker. The gradual dissemination of Vorkus methods, including modelling, demonstrated the lasting influence of the Bauhaus within education. The movement finally propagated Albertian ideals, emphasising the importance of the model as a conceptual design tool, at the beginning of the twentieth century. The model emerged from the architectural archives, but still not out of the drawing's shadow.

Fig.14: Beaux-Arts architecture students

1.2 The Model's Rival: The Drawing

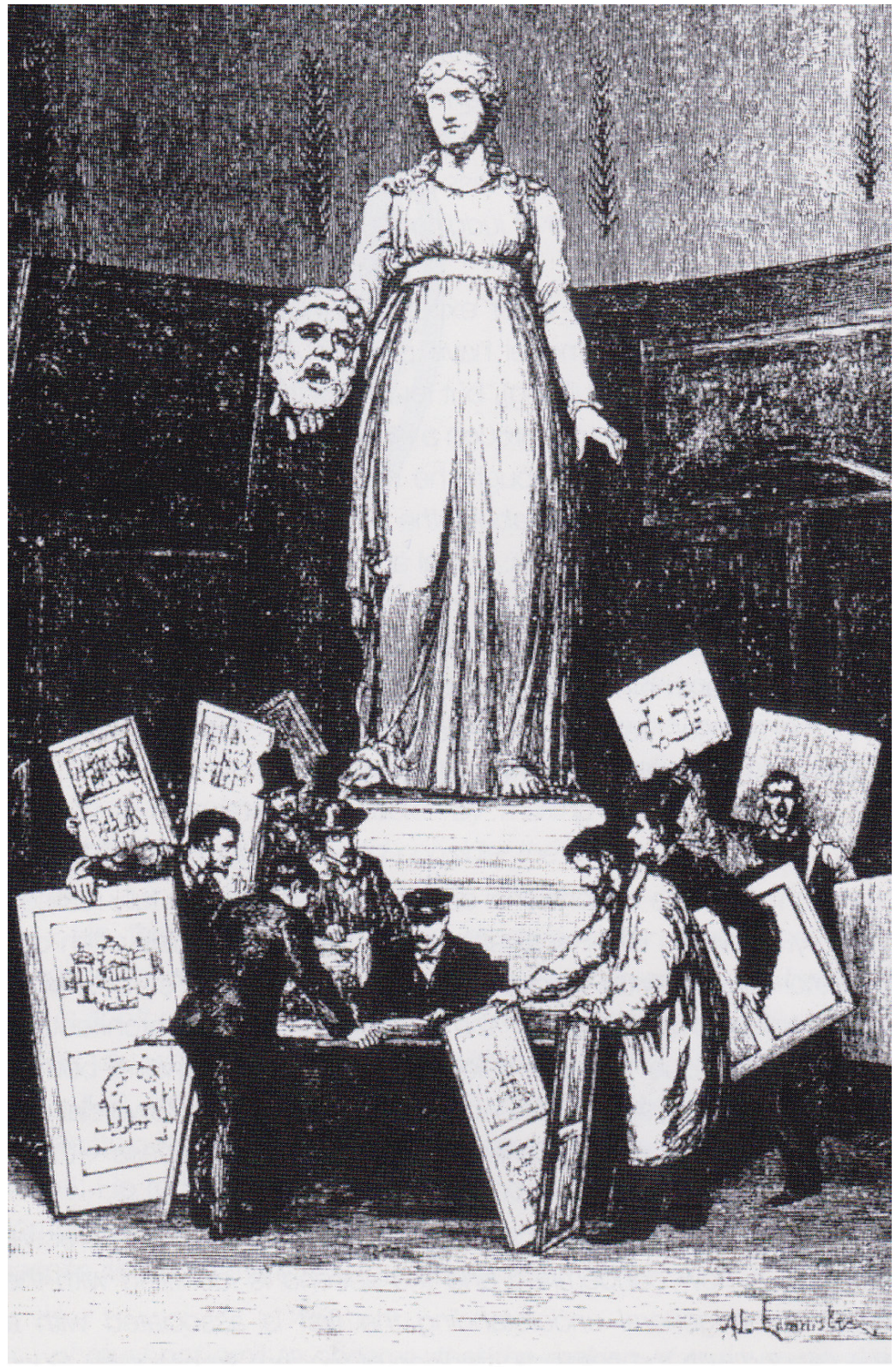
'The...aim of architectural instruction is to teach students to build good buildings rather than...make beautiful drawings.'[20]

By the beginning of the twentieth Century, the Beaux-Arts infatuation with virtuoso drawings was having a detrimental effect on design quality (Fig.14). But, *'as Modernism went down to defeat, drawings once again became the preeminent architectural medium they…had been in the past. But they did not drive out the model.'*[21]

Even by the 1960s, modelling was still not commonplace at universities. As Mark Morris states, *'the crafted scale-model carrying the bulk of an architectural idea and generated throughout the design process was...a rarity.'*[22] Remnants of the Beaux-Arts attitude towards the superiority of the architectural drawing still lingered some five-hundred years on.

The Architectural Association and Cooper Union were the two schools which acted as a nuclei of influence from the 1960s-1980s, and both saw a revival of the drawing as *the* mode of representation. The legacy of the Beaux-Arts representational ideals within the leading institutions now presented the authentic architectural hand-drawing as a commercial commodity popular with collectors.

However, the late 1970s also saw the emergence of autonomous architectural model objects in response to their increasing demand on the art market (alongside drawings). Eisenman perhaps helped fuel this but, as an advocate of the model as artefact, he argued for the model's ability, like architectural drawings *'to have an artistic existence of [its] own, one relatively independent of the project [it] represented.'*[23]



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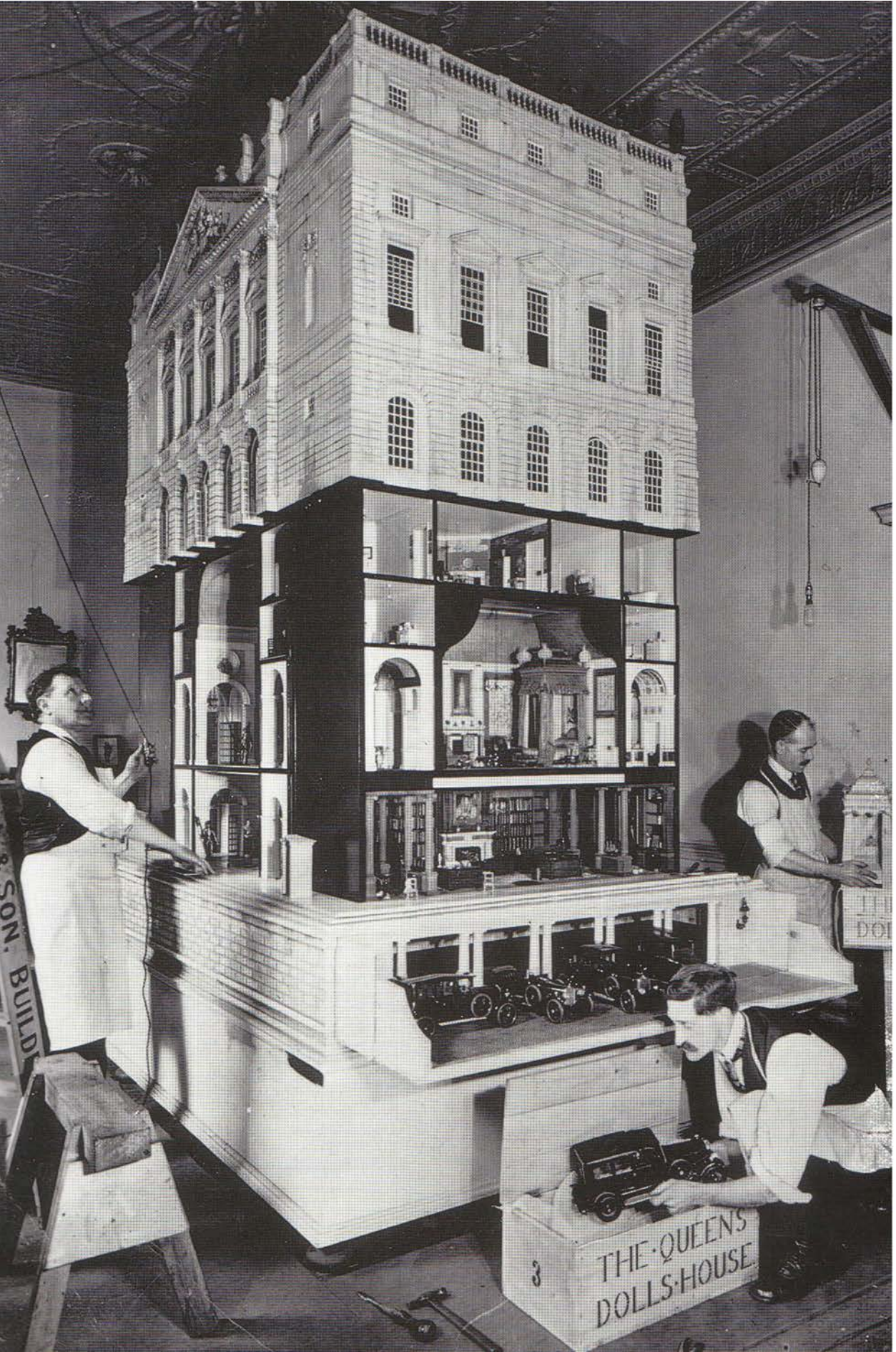
1.3 The Model Today

'The digital future will render models superfluous.'[24]

The traditional handcrafted model in recent years has been declared a dying tool. The 1990s saw great technological and material innovation for the architectural model. We now navigate virtual models through digital software and control milling, lasercutters and 3D printing, supporting the creation of a different sort of architectural model, one with an highly precise and predictable output (Chapter Six).

The physical model is relevant today as a design tool, yet it still has a largely representational value. It is not necessarily exploited as a design driver but more commonly functions as the semi-realistic final model of a known proposal. This attitude towards the model as playing a supporting role to the drawings is a notion which seems hard to shake, perhaps owing to time limitations, cost restraints and that it does not reside within the authoritative bounds of a computer. *The model* demands real space and is defined by its physicality as an object.



02

MODEL AS OBJECT

CHAPTER TWO:

Model as Object.

1.1 The Miniature Fetish

Fig.15: Lutyen's Doll's House for Queen Mary, 1924.

Architects are regularly accused of fetishising the model as an object of miniaturisation but, perhaps more constructively, this preoccupation can be seen to lie with the model's existence as an object *through which the effects of scalar disparity* can trigger the imagination.

The architectural model is typically a miniature. We are preconditioned to understand miniature objects, and therefore the model, since our childhood, through toys: train-sets, dolls'-houses and so on (Figs.16-18). Architectural models are frequently compared to toys, as serious playthings. They exist at a size smaller than reality and as a manipulatable volume at a miniature scale, endorsing play, allowing the testing of serious ideas and scenarios without consequences. Their toy-like characteristics may evoke humorous or kitsch connotations, however, the toy's purpose falls short of the model's: a model unread, or read as a superficial object, adopts toy-like attributes.

Nostalgia is a trait commonly associated with the miniature. Susan Stewart depicts the role of the dolls'-house as a stage for choreographed adult themes with '*two dominant motifs: wealth and nostalgia. It presents a myriad of perfect objects that are, as signifiers, often affordable, whereas the signified is not.*'[26] Lutyens dolls'-house for Queen Mary, was constructed in his sitting-room (Fig.15). He never tired of it; even the library books were readable under a microscope. Many adults, similarly to Lutyens, retain the child's enjoyment of the miniature. The model's diminution of the building – though distorting the vastness of its reality – has a comparable effect, conjuring fascination and nostalgia which makes models powerful communicators of ideals and social aspirations. The architectural model, like the dolls'-house, historically expressed wealth, domestic ideals and social aspirations.

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Fig.16: Bekonscot model village.
Figs.17-18: Model railways

As architectural objects, models are familiar to the everyday, but are aesthetically intricate enough to appear sublime compared to everything else. By coupling mundane architectural characteristics with the miniature, certain qualities, beyond those attributable exclusively to size or scale, are presented.[27] One of these is figurative, involving the visual intensity of data: *'buildings seldom have the clarity-in-complexity of a model...Models gain energy by being small.'*[28]

Conversely, the model's spatial density and aesthetic ideals can distract the designer, conjuring preoccupations with 'miniaturism' – an attitude linked to the disparity between the working-scale and reality. This effect, known as the 'Gulliver Gap,' establishes a distance between the architect and the concept, evoking curiosity.[29] But the model, for precisely this reason, can all too easily become fetishised.

If the 'Gulliver Gap' exists (Fig.20), one could argue it is that space wherein most Architecture is conceived. It is only through such an awareness facilitated by the miniature and the interposed distance that

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Fig.19: Alice in the White Rabbit's House.

Fig.20: Gulliver's Travels.

many projects originate. Gaston Bachelard explores the sublimity of miniaturisation where *'the imagination is both vigilant and content'* and that in order to understand what is big in something small, one must think illogically.[30] We must employ our imagination.

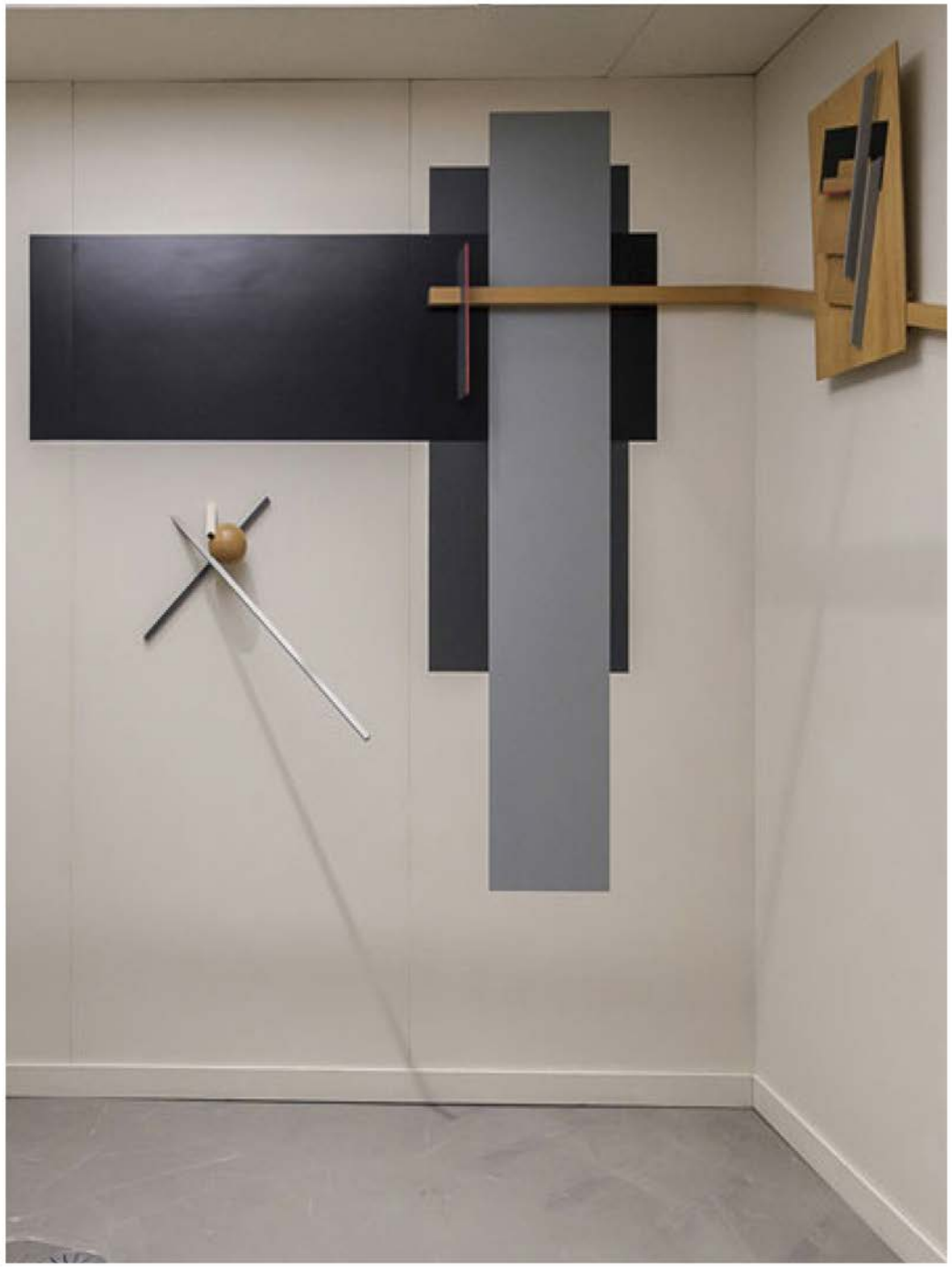

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Fig.21: El Lissitzky's Prounenraun.

2.1 Scale and Imagination

The model embodies 'a labyrinth of reality and fiction.'[31]

Toys are linked to scalar narratives. Children's literature frequently centres on miniaturisation owing to the child's unique scalar relationship to their surroundings. Our sensitivity to scale is instilled during infancy, when most objects are either too large (cutlery, furniture…) or unnaturally small (toys). As we grow, our relationship to these objects alters.

The exemplar children's novel, which continually deals with scalar shift and captures the imagination of children and adults alike, is Lewis Carroll's Alice in Wonderland. Alice longs to alter her scale: one minute she is too large to fit through the gate, the next she becomes too small to reach the key from the tabletop (Fig.19).[32] An obsession with scale permeates popular narratives, from traditional stories of giants in Gulliver's Travels to the more contemporary Toy Story. These fictional tales stimulate the imagination.

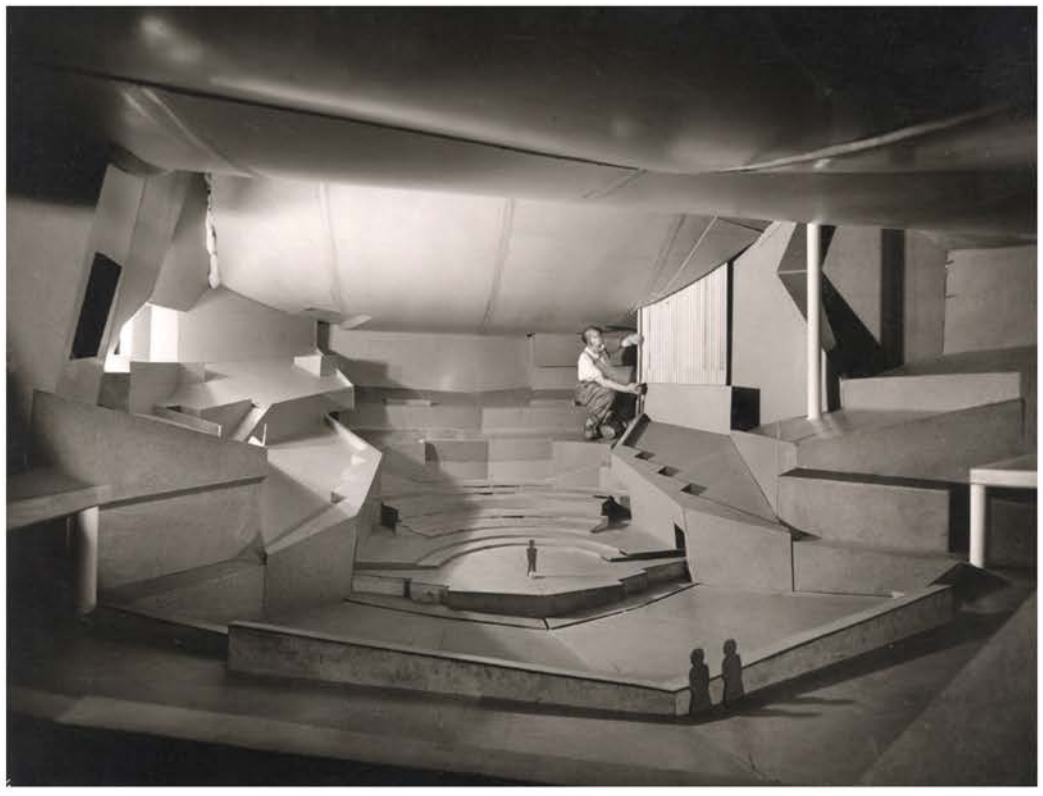
The toy and scalar literature both require the audience to think imaginatively. The same is required of the model. The human relationship to the literary character or indeed the architectural model involves a scale-shift. Rudolf Arnheim imagines architects think in model-form, to scale. He states that *'the architect must keep in mind that the final product…is a huge structure to be...used by small creatures. The difference between a scale-model and...building may lead to psychological discrepancies.'*[33] That is to say the gap between scalar thinking and full-scale building is where you find the scale-model itself.

The model, although it conjures nostalgic associations and has playful qualities reminiscent of childhood fiction, transcends the popular understanding of the model as an appreciation of the miniature. The value of the model is mainly seen to exist in its miniature characteristics, however the thought process stimulated in its making is its main value to the designer. The model physically embodies the idea of a building (in miniature).

El Lissitzky's 'Prounenraum' installation (Fig.21) might be considered a full-scale model, announcing a new spatial artform in which works *'are no longer contained within exhibition spaces but become continuous with them.'*[34] Unconfined to a pictureframe, the installation becomes an immersive experience. As an object, the model simulataneously inhabits the right and wrong scale. On a scalar disparity spectrum 'Prounenraum' falls between being a real, occupiable space and a model. Like cutlery to a child, it functions at a usable, but distorted scale. Similarly, scale-models offer a spatial experience at a scale distinct to that of the represented

reality. The architectural model rarely takes on these full-scale immersive attributes.

The closest the architect gets is perhaps a full-scale fragment model or a 1:9 experimental model, as was the case with Hans Scharoun's Philharmonic Music Hall, whose photograph itself illustrates a disparity between human and model scales (Fig.22). Unlike conceptual models, these larger, more immersive models are usually more akin to prototypes. As the project develops, the model increases in scale and the 'Gulliver Gap' begins to close.



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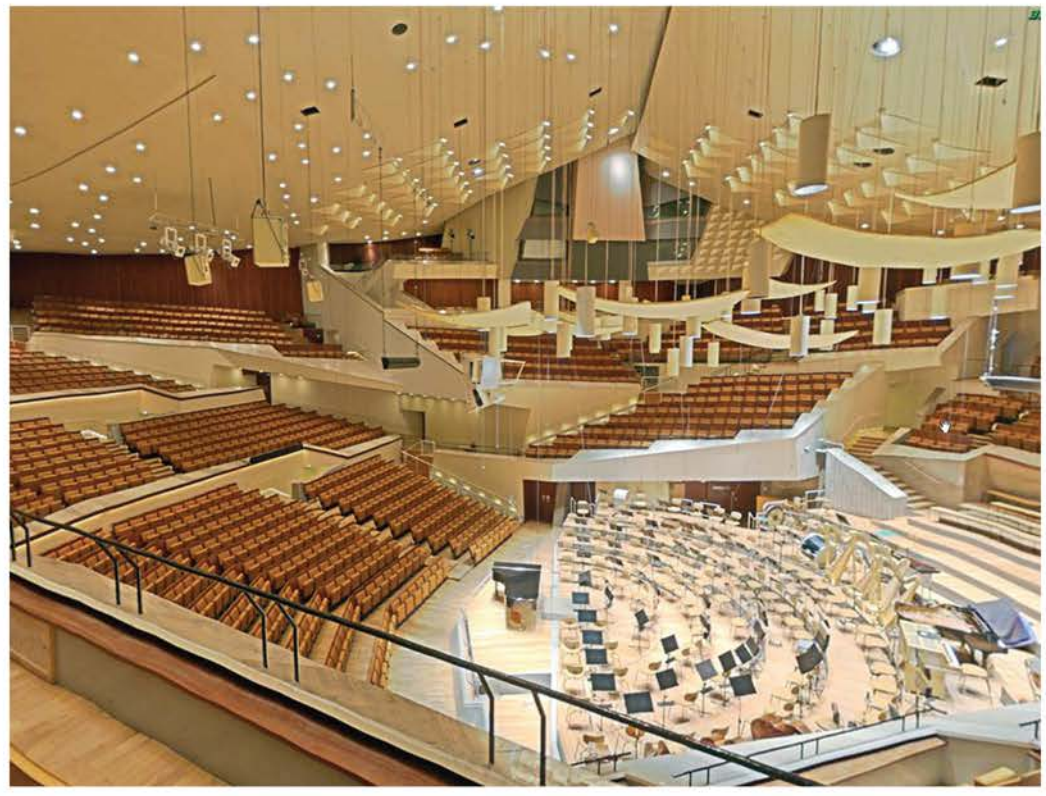

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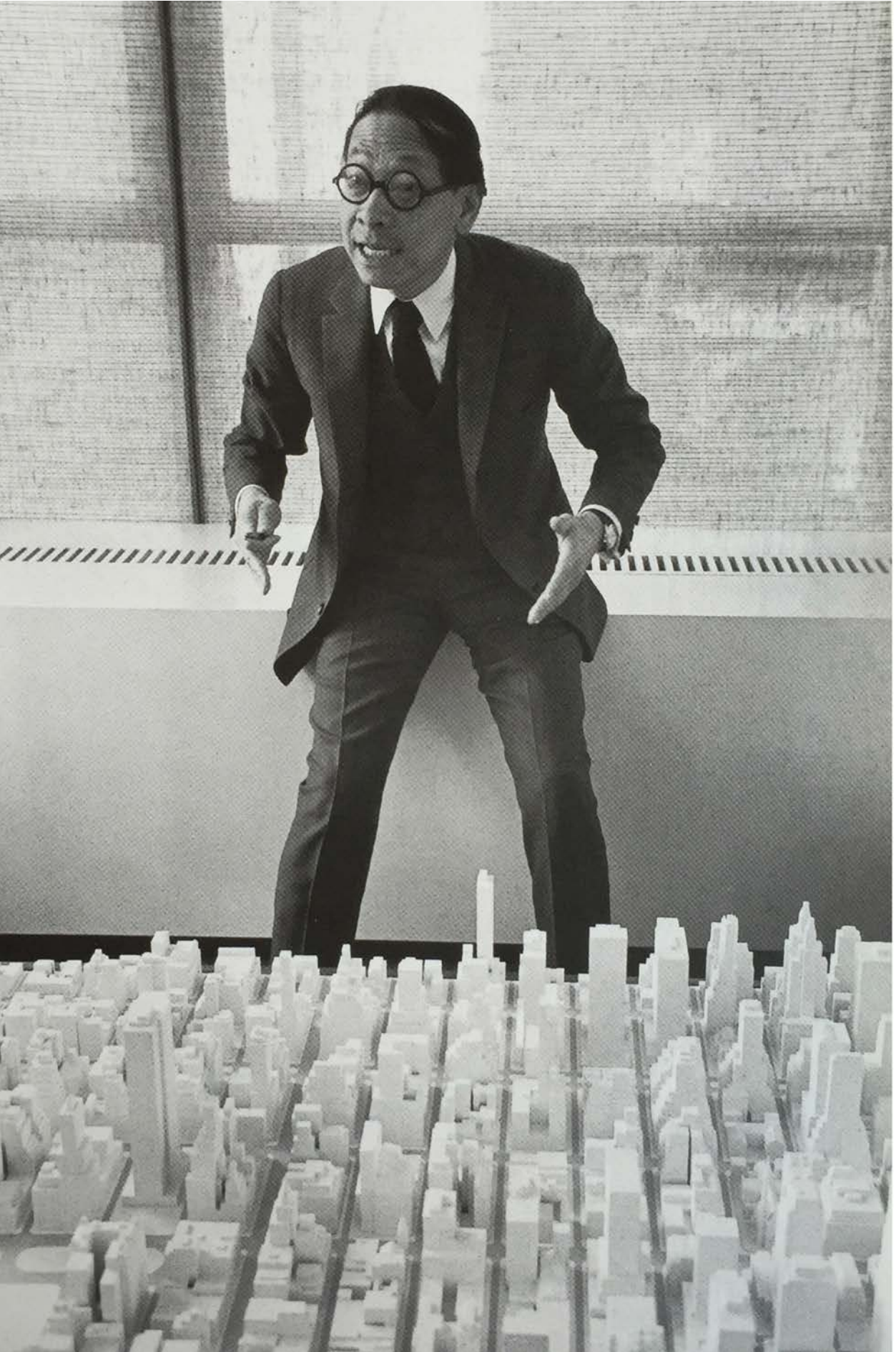
Fig.22: Hans Scharoun
Berlin Music Hall model
Scale 1:9.

Fig.23: Berlin Music Hall
as built.



03

MODEL AS IDEA

CHAPTER THREE:

'The model is the quintessential representation of an idea'[35]
Frederic Migarou

3.1 The Physical Embodiment of an Idea

Modernist sculpture and painting was concerned with the play between object and representation. *'Much of the richness of Modernist pictorial experience lies in our perception of tensions between the actuality of the work as an object and its representational readings.'*[36] Following the direction established by Picasso's guitar model, which introduced a three-dimensional Cubist syntax to present a physical abstraction of the object (Figs.26-27), many works have located themselves on the boundary of pictorialism and objecthood. Until this time, cubist syntax was confined to two-dimensional abstraction on canvas, but Picasso's cardboard and string investigations in real space revealed previously unseen interpretations of the object, with spatial and architectural associations. Architects have acknowledged the remoteness between the scale-model as the miniature embodiment of an idea and the model as the representation of an actual building by creating artefacts which present architecture, rather than represent it. The model attempts to manifest something intangible (the idea) in something physical. It is not explicitly dependent on the Architecture it denotes. As Graves has said on modelling: *'We're not making real buildings; we're making models of ideas.'*[37]

The model is too often interpreted as a surrogate for the building, and *'only in exceptional cases as an object with a history and potential of its own.'*[38] Its value need not be rooted solely in pictorial, representational objecthood, the more contemporary model can also operate as an instructive artefact capable of exploring concepts. This essay establishes the architectural model, like the drawing, as having generative effects on the proposed design, provoking unforeseen ideals and culminating in the 'sketch-model,' a model which represents the idea or notion of a building rather than the building itself.

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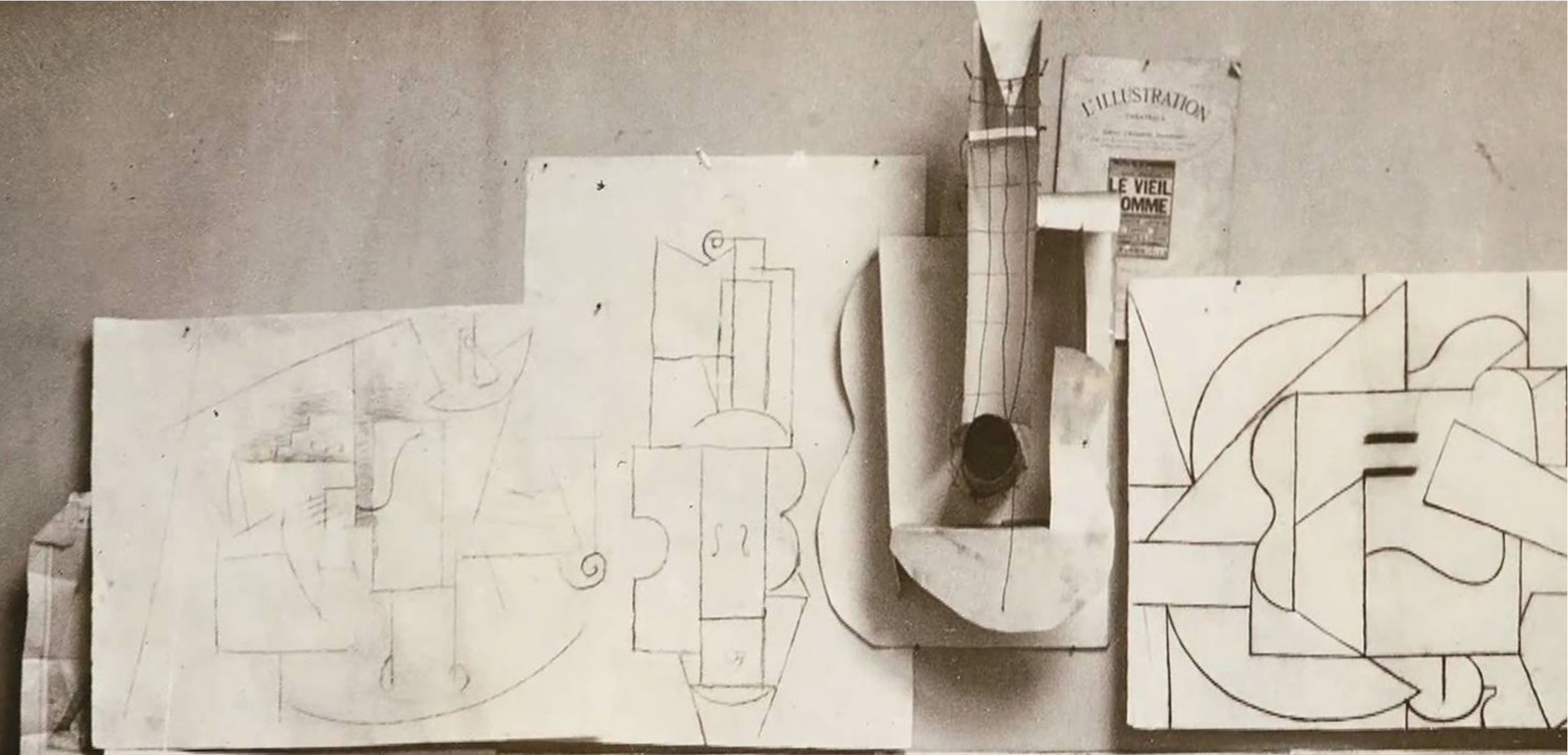
Fig.24: I.M.Pei presenting his models.

Fig.25 (left): Brodsky and Utkin Paper Architects.

Figs.26-27 : Picasso's guitar model and sketches.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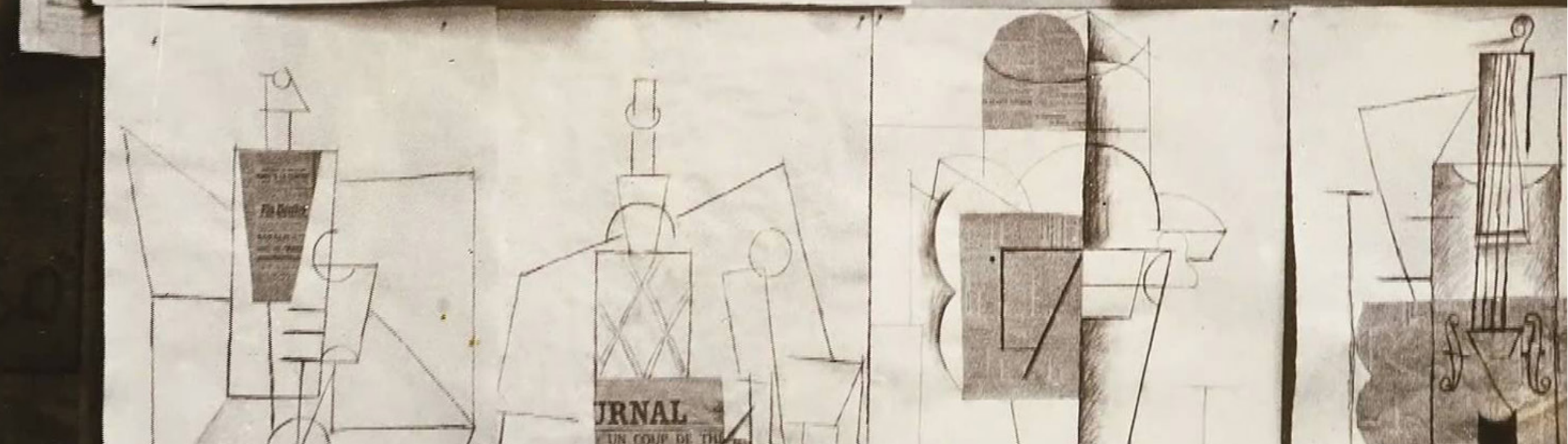
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Fig.28: Zaha Hadid's model.

Fig.29: Coop Himmelb(l)au model/sketch.

With the idea modelled, the resultant artefact begins to adopt new meaning beyond its initial conception. The new life of the model then conditions further ideas, becoming a generative tool in itself. This interrelationship between concept and artefact has the capacity to embrace phenomena external to the object itself, allowing the maker, or equally the audience, to reinterpret the idea through memory, intuition and experience. The production of architecture in this way could be said to occur between the recurrent reciprocity between thought and model. *'The tension of lines on paper or cardboard in space has an insistence…that describes possibilities which...could not be imagined in thought alone.'*[39] Despite being a referent, it has its own identity, unpredictability and, it follows a self-consciousness; architectural models operate similarly to the marvellous stick, first offering *'the ability to begin formulating an understandable measurement for defining the invisible unknown'*, then presenting new readings and possiblities.[40] It thus exists as a thinking mechanism for the architect, inventing possibilities for the architect to discover.

Architects should confidently employ models conceptually and select an intensity of realism suited to their purpose. To criticism that his preliminary studies do not resemble the buildings they precede, Graves counters: *'that's not the point'*. Why should a model imitate a building '*any more than a…Cubist guitar…should look just like a guitar?...the metaphors or rituals or ideas of a kind of formal structure are more to the point.*'[41] For him, the role of the abstract model was to capture the architectural essence.

Although most architects practice the profession to construct buildings, there are some who design predominantly for concept and the latter group's preoccupation with the abstract development of ideas and their self-indulgent trait of not designing for the 'real world' cannot be isolated; there is a longstanding tension between art and architecture: Gehry once admitted *'crossing the line between architecture and sculpture is something that's been difficult.'*[42] Malevich's Suprematist explorations on volumetric forms signified a critical moment for the model.[43] He recognised that his formal compositions addressed the issues of architecture as much as art. His 1918 plaster studies were entitled Architektons (Fig.35). He did not claim they were anything more than *idea*, distinguishing between the *'purely architectonic, devoid of purpose'* and the '*specifically architectural, material expression of a stated purpose*'.[43] His Architektons occupied the former.

Future generations of creatives were influenced by this unrestrictive approach to design representation: Zaha Hadid and Wolf Prix of Coop Himmelb(l)au (Figs.28-29) both acknowledge Malevich's influence in their drawings and models. Pichler too constructed full-scale conceptual models which were neither architecture nor sculpture, but large

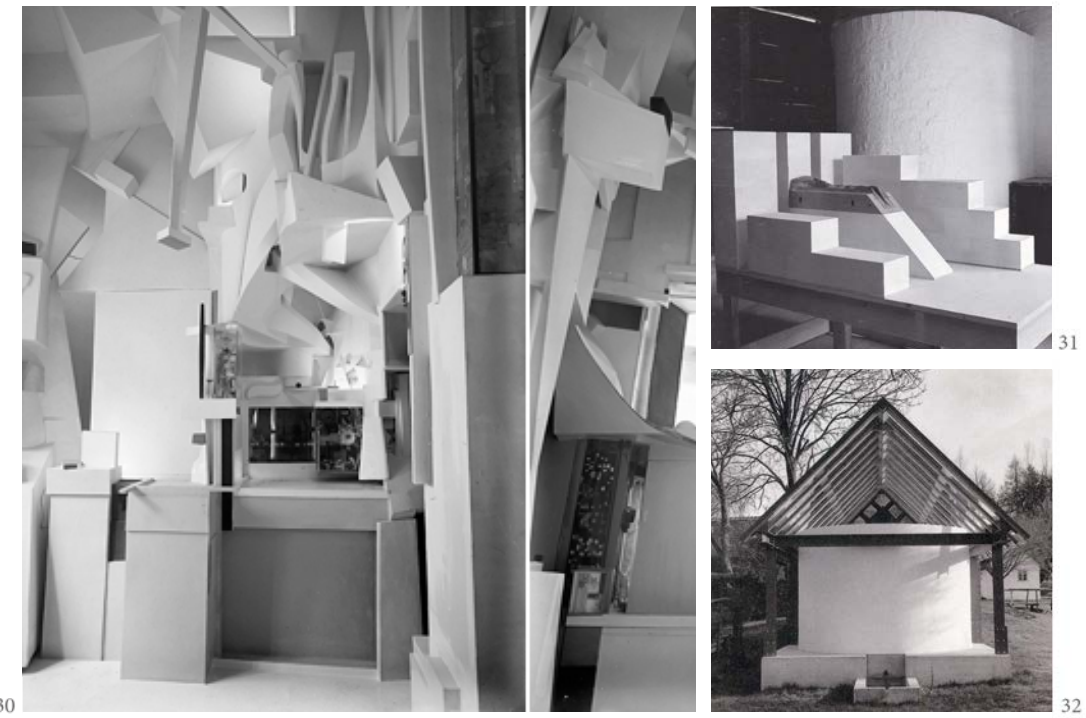

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Fig.30: Schwitter's Merzbau, Hanover.

Figs.31-32: Pichler's full-scale conceptual models.

representations of philosophical notions (Figs.31-32). Finally, Schwitters' Merzbau experimental hybrid art and architecture installation in Hanover between 1923-36 (Fig.30) arguably reflects Suprematist principles. This inherent *'territory of abstraction, these transitional blurred zones in which…models – freed from realism – operate',* is where Graves' '*metaphors, rituals and ideas*' reside.[44] It is the place of abstract research and artistic self-determination, the place to which progressive architects seem instinctively attracted. Models now offer a much broader medium of investigation, whether for speculative projects, or the study of visionary philosophies. The model becomes an all-encompassing tool to test ideas.

Removed from the practicalities of building, the autonomous model can wander into the world of 'the arts', as was the case with Moscow's 'paper architects' of the 1980s whose designs were never intended to be built. Their personal and often ironic work commented on the stagnation of architectural practice under Khrushchev and Brezhnev. Their drawings and models became an act of liberation and provocation: *'exercises in the survival of the imagination.'*[45] Consequently architectural representation became less strictly defined and their radical ideology influenced the discourse.

Eisenman argued for the model as having '*an artistic or conceptual existence of its own.*'[46] This school of thought, reminiscent of the Architekton, culminated in the 1976 exhibition *Idea as Model* (Fig.36). Dedicated exclusively to models, its primary concern was to illustrate this hypothesis of the model as '*something other than just a narrative*

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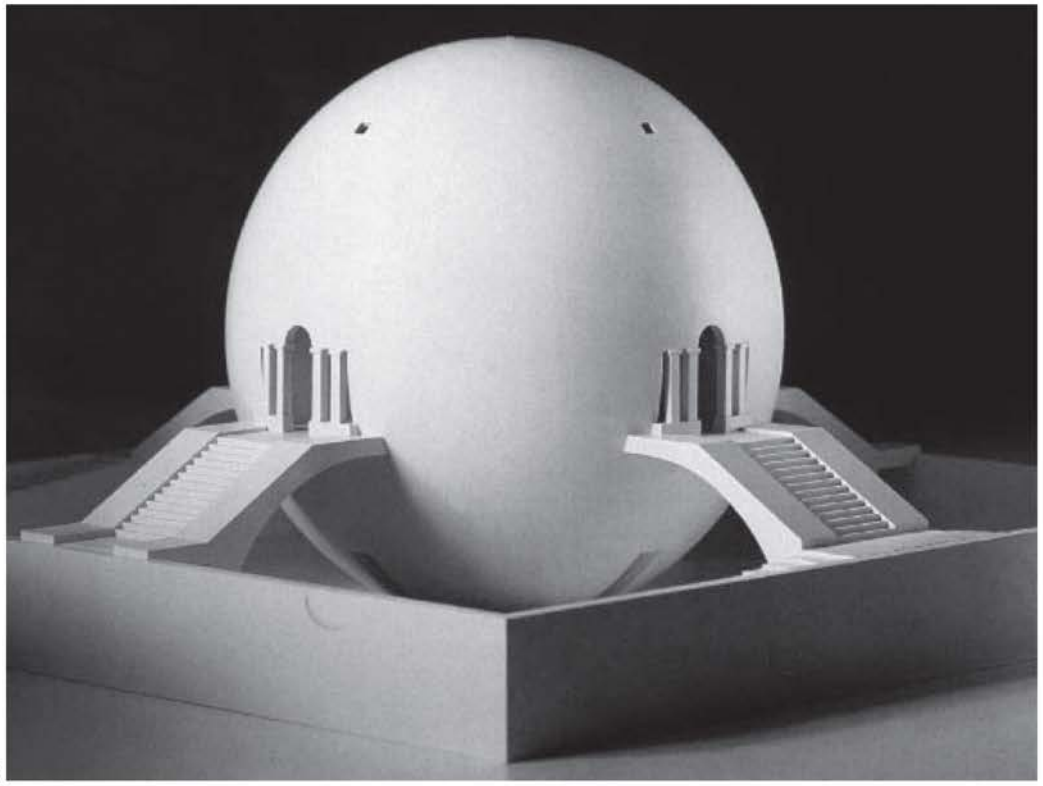

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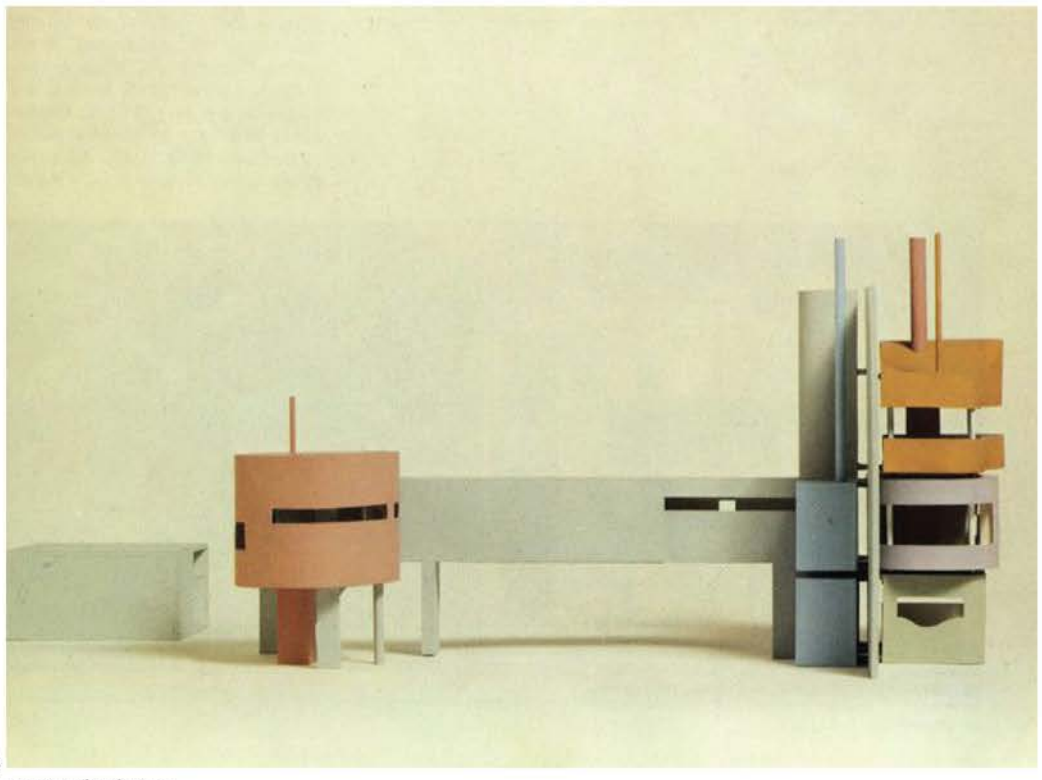

Fig.33: Ledoux's Farm Guard House model, 1987.

Fig.34: John Hedjuk's Bye-House model.

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Fig.35: Malevich Architekon, 1918.

record of a project.'[47] It could be claimed that the model functions alongside its architecture and that its value is diminished if (mis)read as a standalone object. If separating the model from the associated drawings or building erodes its meaning, that should not nullify it. Perhaps the model exists not to defend the original concept, but instead to act as an organic, developmental tool, iteratively revealing new meaning. Hedjuk's Bye-House models (Fig.34) exemplify this: his ideas arose not from preconceived strategy, but through observation of the models and drawings themselves, from form to metaphor. The iterative process and sequential decision-making is more valuable than the realised model: '*in architecture the idea is sometimes the thing itself and not something about the thing.*'[48] This assumes that the model as an idea is self-referential. However, this specifically addresses the conceptual model whose importance lasts for a defined window of time within the design. We must retain a distinction between the model as a vehicle to communicate with the masses, and what is being described here: the abstract model, which is ultimately a self-referential design tool.

The sketch-model, like the conceptual drawing, fragments architectural reality. Photographic realism was never necessarily what architects intended for the physical model. For analytical models, perhaps, but for themselves, rarely. The sketch-model develops ideas and facilitates creativity and imagination. It is not required to demonstrate the reality of the building. The conceptual model constitutes an intermediate condition of the architectural reality.

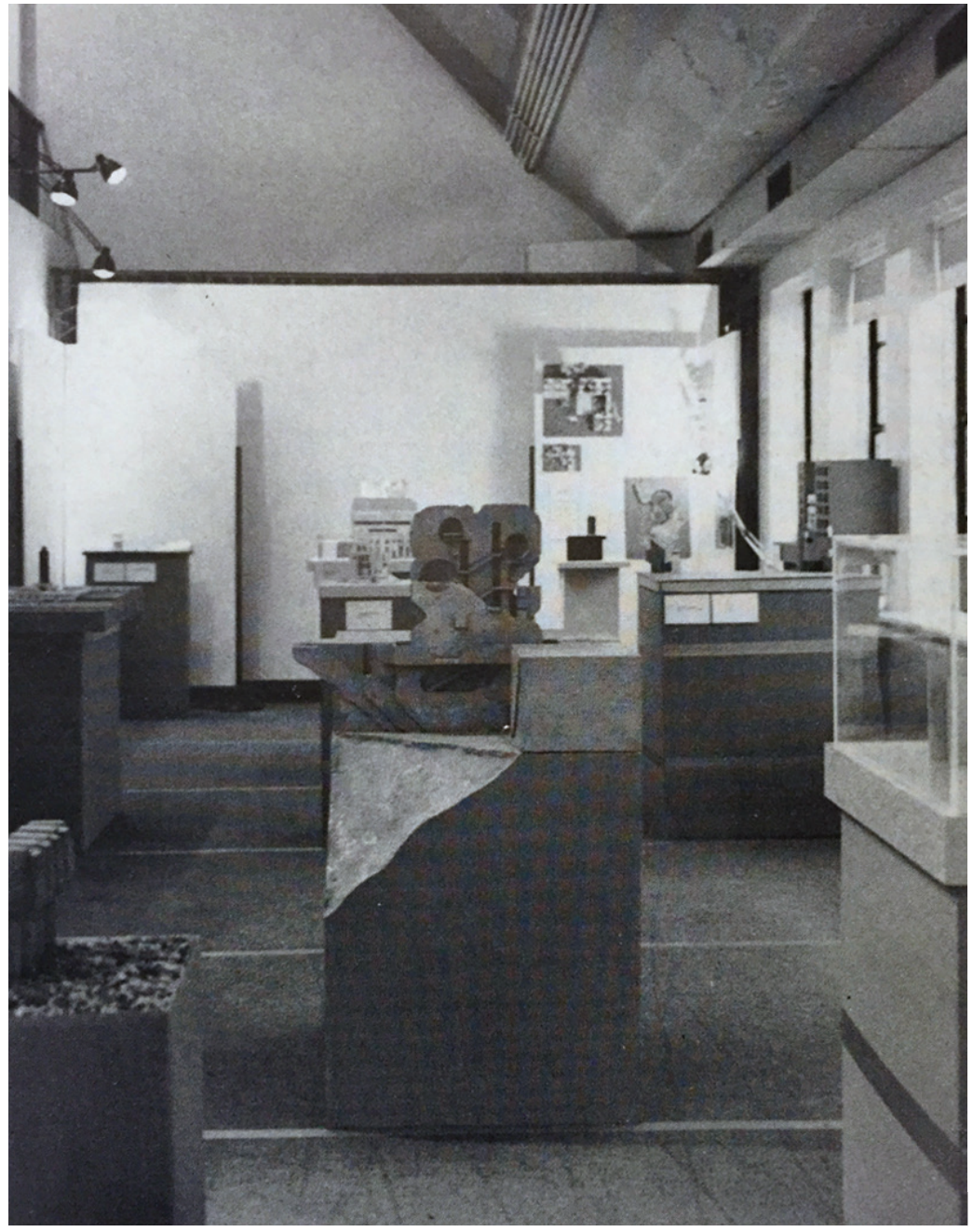

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Fig.36: Idea as Model Exhibition, 1976

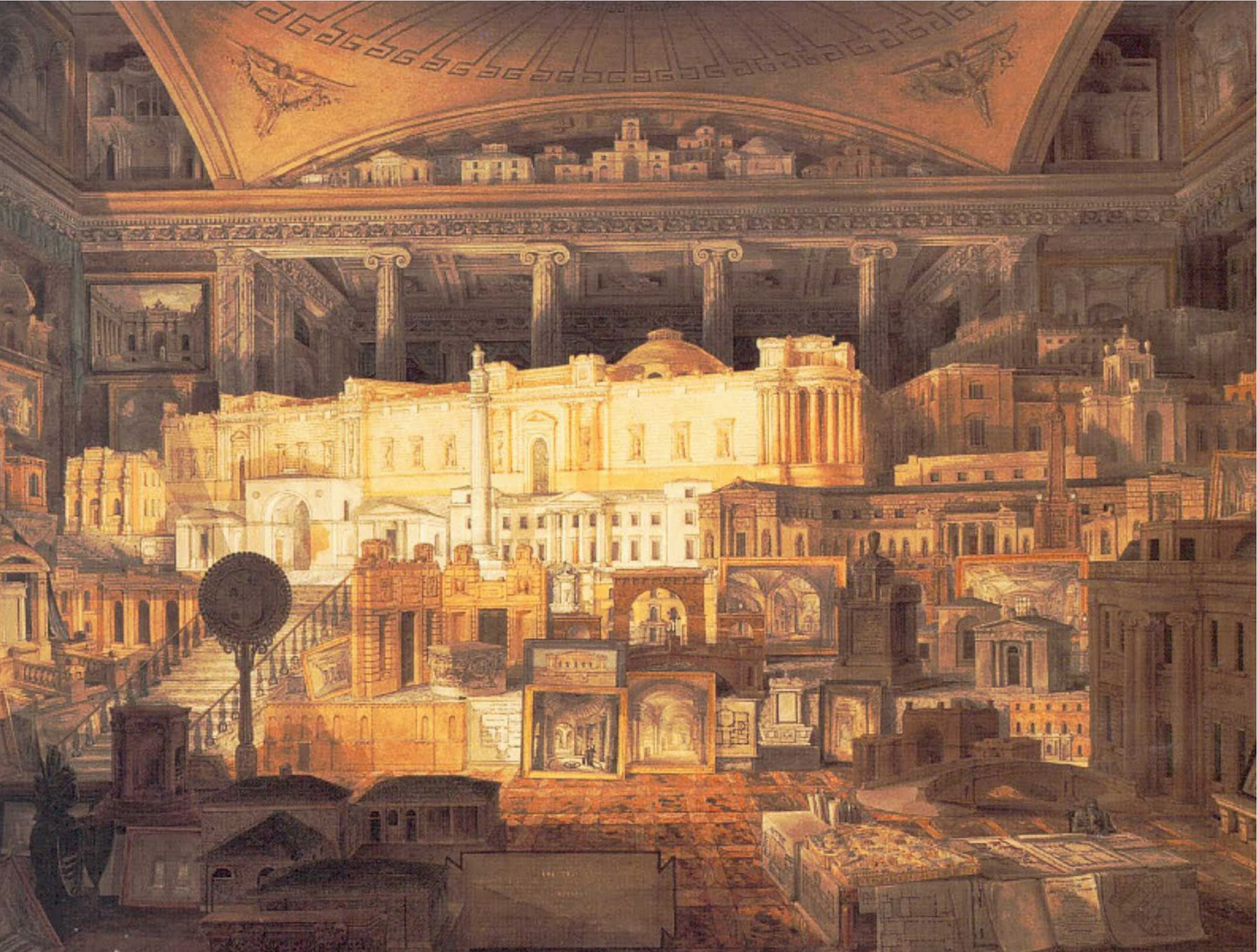

Fig.37: Ghandy's painting of Soane's models together in one room.

3.2 A Utopia Called Model

The architectural model is the link between the architect's utopic ideals and the real building arising under the influence of numerous conditions, an intermediary zone defined by architect Yanagisawa as '*a utopia called model.*'[49]

Models are not required to accommodate human occupation, and as such can assume the role of spatially representing the imaginary. They are perfectly suited to project innovative, futuristic propositions, however buildable they are. The model '*is regarded...as the most convenient surrogate for a reality that cannot otherwise be apprehended...without distortion.*'[50]

'*Perhaps the model concretises the ontic condition of the project. It exists as desire–in a kind of...utopia. It holds out the promise of inhabitation, even if it does not fully afford it.*'[51] The poignancy of Ledoux's models constituting an ideal but unbuilt 'model' city, or of Hedjuk's unrealised Bye-House series combining the design development with its anticipated demise, typifies the model's condition of being just outside the limits of building, bordering representation and actuality (Figs.33-34). Similarly to a picture frame, it demarcates the boundary between the work and beyond. It is neither internal nor external, neither a purely representational nor transcendental artefact: it claims an independent objecthood, yet in isolation remains incomplete. The aspiration of the model is to imitate something else, to act as '*a surrogate which allows for imaginative occupation.*' The model will always remain a model of...[52]

Harbison, author of Eccentric Spaces, claims Ghandy's scene of John Soane's built and unbuilt works as a collection of models (Fig.37) exemplifies the '*miracle of models, which can put the whole world in a small space.*'[53] It incites spatial questions concerning the marginal line between model as utopia and model as a physical representation purporting to express real Architecture.The fictional beginnings of the project and the designer's imagination are things which, when physically manifested in a model, capture a frozen ideal, free from pragmatic constraints, and lead to an ultimate reality.

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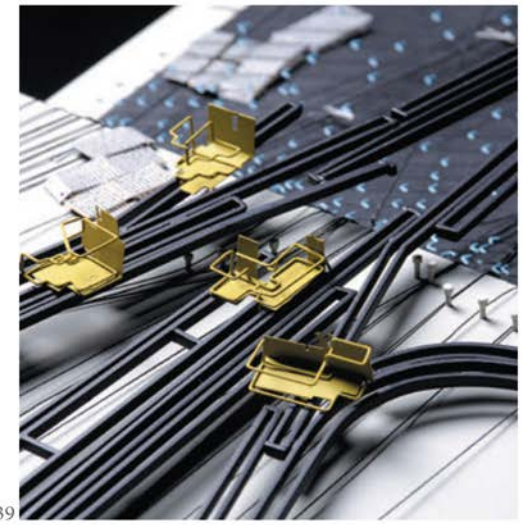

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Figs.38-39: SmoutAllen conceptual models

Fig.40: CJ Lim's cake model: abstracted essence of architectural language.

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Fig.41: Thorpe with Lutyen's model for Liverpool Cathedral. ca.1933

3.3 (Dis)Empowerment: From Idea to Reality

Architects and students alike frequently lose themselves in the model's dreamworld. The model is where we fulfil our design ideals. '*Huge effort is…invested in models…as a kind of substitute for the real thing, an end unto themselves*.'[54]

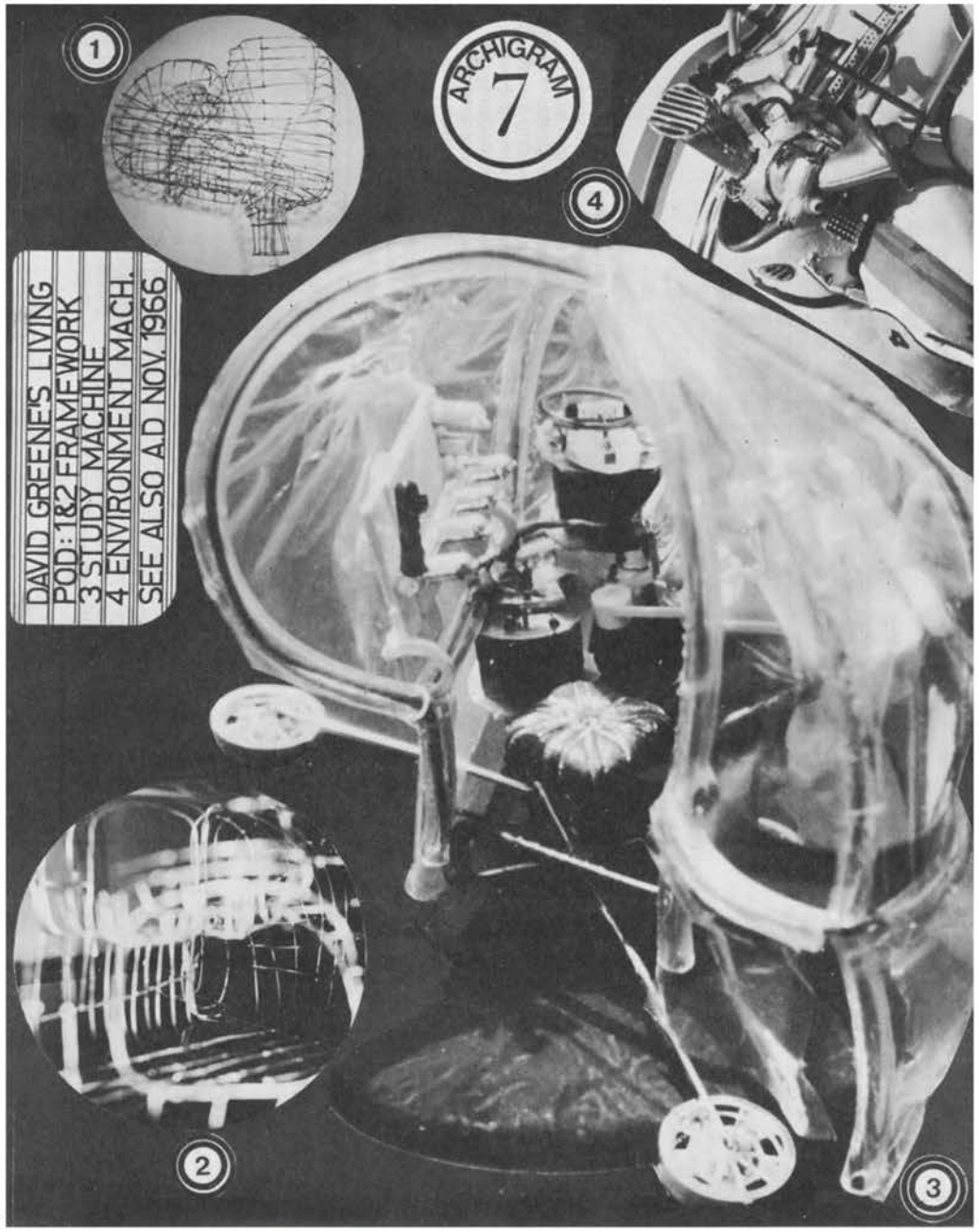
Miniaturisation creates fascination. But, as Stewart notes, through producing miniaturised realities, qualities of the giant in the maker are created. The model embodies fictional gestures and accommodates logistical doubts. This manifestation of architectural ideals through the scale-model emphasises it as an empowering conceptual device for the architect. It offers a sense of control over the physical architecture which undermines contextual practical influences. Yet this empowerment is fleeting, existing in the momentary gap between model and building: practical issues of cost, planning, client, to name but a few, tend to dilute those initial concepts, resulting in compromised designs.

Wren's *Great Model* is a poignant example of the model's potentially disempowering nature. Offered as a final model, in its totality it undid itself. It was crafted in accordance with previously approved drawings, so the king and patrons could view the interior. Instead of impressing, the model was more comprehensible than the drawings and numerous changes were demanded, with the dome, the quire and the West front redesigned.[55] The cathedral as built was a cruel compromise: apocryphal stories recount Wren weeping at the news of his model's rejection.[56] The *Great Model* was to be his last.

'It would be a mistake to point to a 'final model' as the culmination of previous...models,' as if all sketch-models could be condensed into one.[57] Whilst working-models may adhere to an architectural language of the designer, a final model entails an intention to communicate more broadly. Unlike process models, final models reveal a totality. One which is often too honest.

04

MODEL AS BUILDING



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CHAPTER FOUR:

Crafting the Object.

4.1 The Physicality of the Object

This chapter dissects the implications of the act of model-making. From Archigram's 'Living-Pod' to Lebbeus Wood's experimental projects (Figs.43-44), the model's utopic qualities make the vision seem more tangible through its materiality. The model's inherent objecthood stipulates a physical, architectural intent, situating it in a material context into which the building would ultimately sit: *'a drawing is a commitment to an idea; a model is a commitment to a thing.'*[58] Whereas the *'architectural drawing fragments the building to produce a knowledge of its parts,'*[59] the model sets out to validate the building as an object.

Fig.42: Soane model archives

Fig.43: Living Pod model, Archigram, 1966.

Fig.44: Lebbeus Woods nightmare cities abstract model.

Debatably, *'the material object has an advantage over the image'* primarily because of its three-dimensionality and inherent legibility to the layperson over architectural drawings made for the trained eye.[60] Models are often presented to the client for precisely this reason, although, as with Wren's *Great Model*, a level of deception is often preferable (Chapter-05). The inaccessibility of architectural drawings make the proposal less readable than the model's figurative and lucid vocabulary.

The model frequently replaces traditional drawings in design development and, occasionally, construction. Pierre Chareau's methodology demonstrates how the legibility of the model can be exploited. Despite no models surviving, he supposedly designed Maison de Verre *'in collaboration with Bijvoet and…craftsman Dalbet, largely through conversation and modelling.'*[61] This approach proves the model can be tailored for interpretation by designer, client or craftsman and can span from concept to construction. Its readability facilitates its adaptability.

Finally, the physical model's disparities with its digital counterpart should be noted. The materiality of the physical model is primarily

what differentiates it from the digital. Philosopher Walter Benjamin argues that, *'buildings are appropriated…by use and perception…touch and sight',* an attitude which might define the difference between digital and analogue models.[62] Digital modelling is a pseudo-architectural mode of representation whose animatic flythroughs render it synthetic. It exclusively relates to vision, while analogue models also enjoy haptic qualities. The analogue models obey the laws of physics, allowing the maker to predict how the structure might behave and feel with some reliability. The language of the digital model differs from that of the physical. When hand-drawing or modelling very distinct scales are adhered to, but these known values are largely usurped upon entering the digital framework. A final crucial distinction between these three-dimensional modes of representation is that the physical model permanently retains the relationship of scalar differentiation: it will always remain something you cannot occupy.

4.2 Moving Mass: Design Through Making

The value of the act of making and physically 'moving mass' to create new physical forms should not be underestimated. Neurologically you interact quite differently when making a model to producing a drawing: modelling directly engages the hands. At Alberti's end of the scale, the model is a vehicle of discovery with the remarkable ability to accommodate amendments: *'you may…add…alter, renew, and…change everything, till all…parts are just as you would have them.'*[63] These adaptable characteristics allow the craftsman to construct, review, deconstruct and reconstruct the artefact repeatedly, differing greatly from the adjustment of architectural drawings. A recent exhibition at the Architectural Association of Steven Holl's Glasgow School of Art presented both drawings and models. At the event, partner Chris McVoy emphasised how the building evolved almost exclusively from models. They were initially interested in creating architecture with a platonic presence and focused on spatiality, not prosaics.[64] The model was the tool which narrated their design in a way that paper or screen could not permit. When asked how he would value intuition, established as fundamental to the design process, McVoy described it as being the ability to allow your mind to consider things which are not logical. And that is how they began to craft the Glasgow School of Art models: they were intuitive inventions.

'Craftsmanship of the calibre required to build the building.'[65]

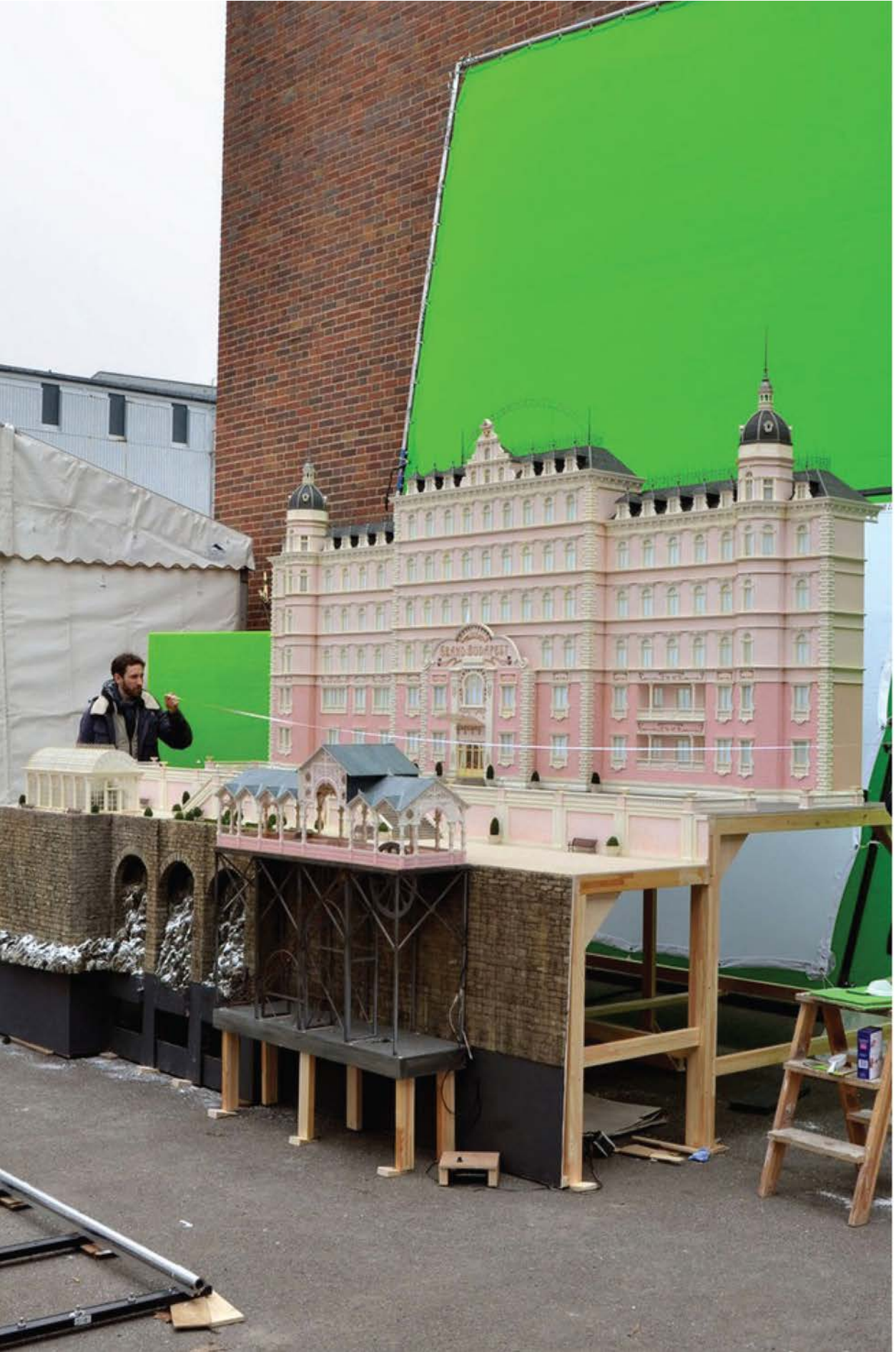
'If buildings are thought to be the ultimate referents for architecture, then the model could be thought of as its semi-fictional account.'[66] By definition the model must be built, reinforcing its relationship with the built environment. Whilst its construction materials differ, the model's production itself becomes a coded, surrogate construct which serves to translate architectural ideas and drawings into a three-dimensional artefact. In this way the model, as McVoy suggests, is a tool to test the design.

The assembly of the model facilitates clarification of compositional attributes and construction of actual building components. *'Building models may be seen as the displacement and condensation of the craft of building, an attempt to recover the aura of the work by fetishising the facticity of surrogate objects.'*[67] Modelling might now play the same role stonecutting previously played in architectural education, where the architect's first marks upon the stone would become physically embedded into the building facade.

Fig.45: Ghery with signature paper models.

4.3 The Signature Model

Finally, we must acknowledge the authorship associated with model-making. The physical model has an individuality resulting from the act of making. Gehry, for example, developed a signature through his crumpled models (Fig.45). As with hand-drawings, the model's maker can be recognised in its style. In contrast, digital modelling and drawing, leads to a homogenisation as there is no inherent maker's-mark, and software often dictates form. The possibilities of card and glue foster intuition and experimentation far more freely than working within the parameter of the programmed software.



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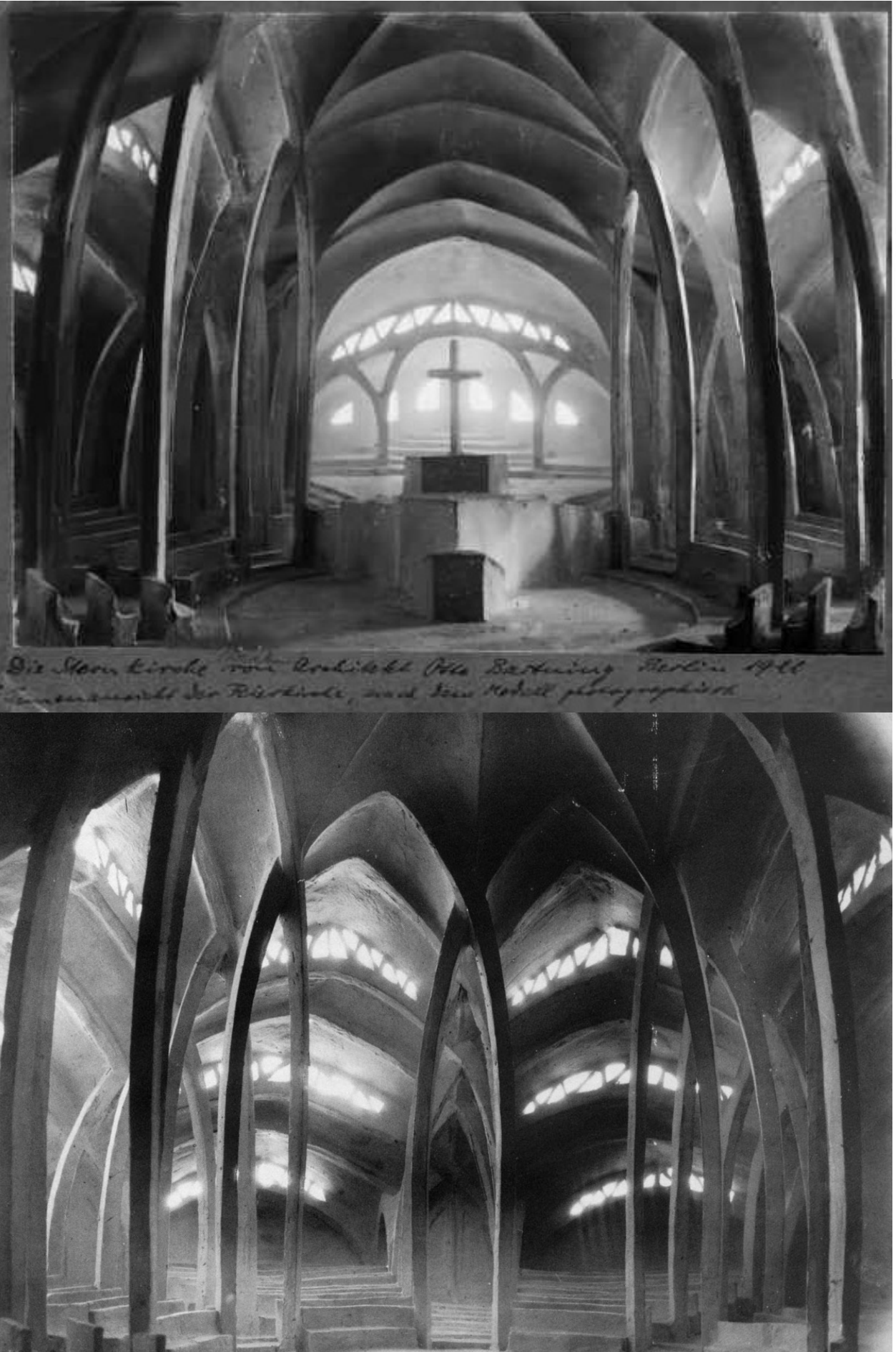
MODEL AS IMAGE



CHAPTER FIVE:

Implications of the Model Photograph.

5.1 Loss of Scale and Flattening the Object

Fig.46: Wes Anderson film-set model

Fig.47: Otto Bartning Stern-kirche model photographs

No architecture publication or exhibition would consider dispensing with the medium of photography, yet only recently has the architectural photograph become *'more than just a 'window' through which to view some faraway building.'*[68] This chapter addresses the model's portrayal through the photograph and consequences of its two-dimensional representation.

By definition, photographs paradoxically translate three-dimensional space into two-dimensional imagery. The photograph reduces the spatiality of the model to pictorial and perspectival space, *'back to the two-dimensions from which it strives to emancipate itself.'*[69] This flattening of the object has scalar implications. The physical model adheres to very distinct scales whilst the model photograph has scalar ambiguity: *'once the camera had liberated the model from the occlusion of scale, its bi-dimensional image began to inhabit a new field of perception on the... printed page.'*[70] Through visual reproduction and distribution, the model entered into a new existence as image, an existence with physical and scalar vagueness, one less able to communicate the essence of architectural space than the model itself.

The photograph's capabilities extend beyond depicting the object. Rather like the modelling process itself, accommodating intuitive design and amendments, the photograph guides the model on yet another journey. For architect Nat Chard, the photograph validates much of his research on performative models. His 'drawing instruments' are both figurative and abstract kinetic models which project paint and light (Fig.48). Here, the model becomes a drafting tool for making something else, acting as a generator that precipitates an event captured through photography.

Fig.48: Chard's drawing instrument.

For Chard, the photograph is the final outcome, revealing unforeseen nuances.[71] It reinvents and re-represents the subject of the model. Similarly Bartning's Sternkirche models served no greater purpose than the production of his famous atmospheric photographs (Fig.47).

Global dissemination of model photography in publications and exhibitions allowed them to reach a wider audience than the model itself (Fig.49). *'The most important precondition for the spread of models from the 1920s was the increasing availability of photography...with offset printing, [making] it...simpler to reproduce images in books.*[72] Methods prior to this were suited only to the distribution of drawings. The photograph freed the model from its objecthood and gave it recognition equivalent to the architectural drawing.

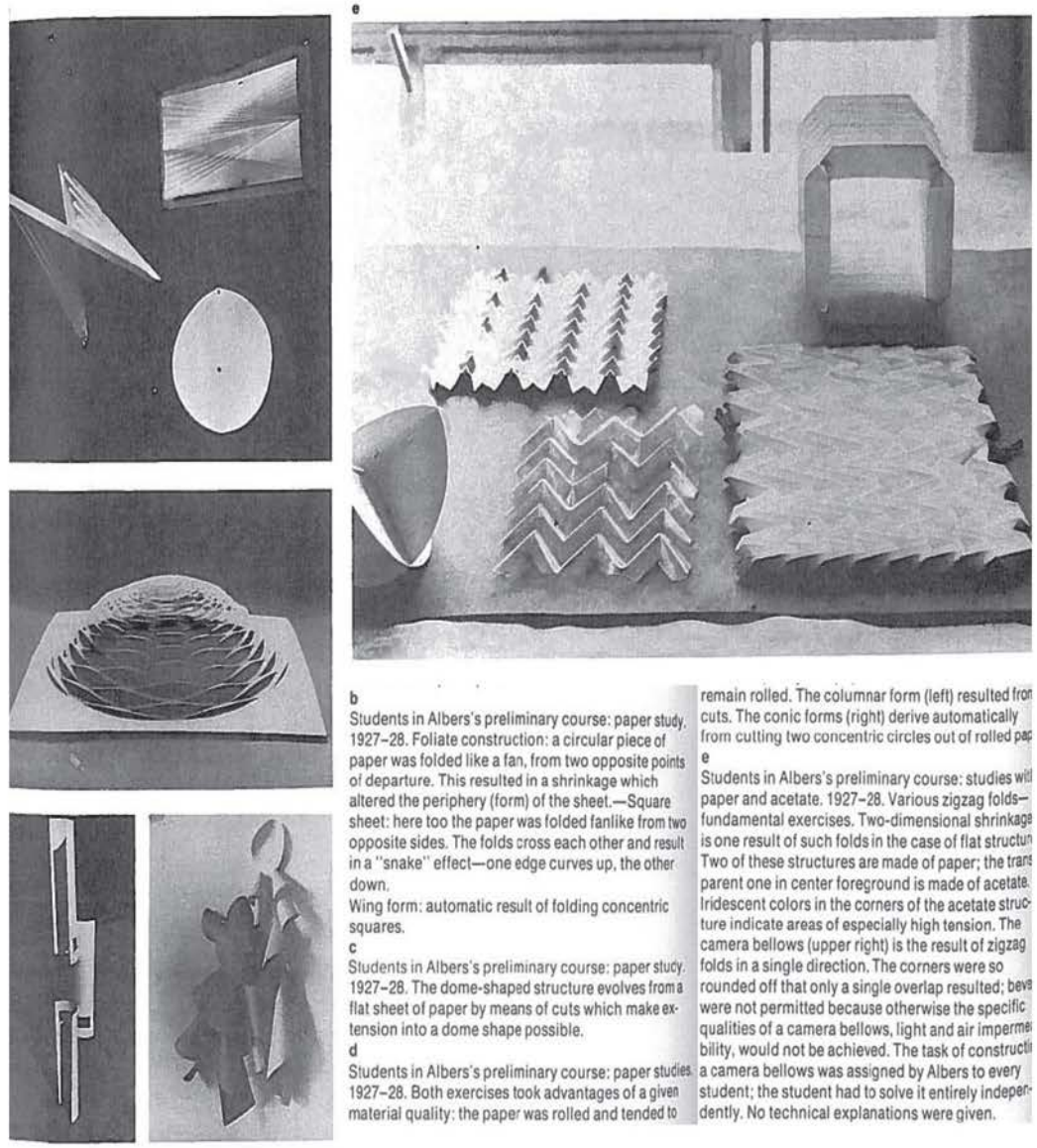


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Figure 49: Bauhaus magazine depicting model photographs, 1928.

5.2 The Legacy of the Model

The photograph survives the object, becoming the model's legacy, just as it does the building's. Typically, architectural models and buildings are photographed in similar ways. Some architects have final photographs in mind throughout the design process, for example, James Sterling supposedly employed *'a pictorial method of building,'* often designing through choreographed viewpoints which referenced the final photographs intended to showcase the building.[73] Although we identify multiple advantages of the model's representation through image, particularly dissemination and longevity, an element of deception and trickery permeates model photography too, which often favours the architect. Through selectivity and post-production, the photograph can highlight or obscure certain features: Tschumi's photograms digitally edited model photographs, creating atmospheric imagery from rather simplistic models (Figs.50-51). This manipulation is not unique to model photography: perspective drawing can operate similarly. But, the model's physicality as Wren discovered, can be too honest. Through its translation into two-dimensional imagery, opportunities arise to conceal potentially controversial viewpoints from the client. The model photograph *'generates its own truth.'*[74]

A photograph presents the model from a singular viewpoint, but can insinuate more. It is difficult to represent the physicality of the model through other media, yet there is a general acceptance that the photograph can trigger a three-dimensional understanding of that object versus its facilitation of the appreciation of the model purely as image. As Hubert posits, both registers co-exist: *'the 'jealously' of the model is ...most explicit in photographs...which are virtually indistinguishable from photographs of buildings. Another form of seemingly motivated representation–namely photography–reinforces the claim to verisimilitude. But...as a simulacrum the model…establishes the building as a reality beyond representation.*'[75] The model image can never demonstrate a true spatial understanding of the architecture like the physical model or building can. The model will always remain illustrative.

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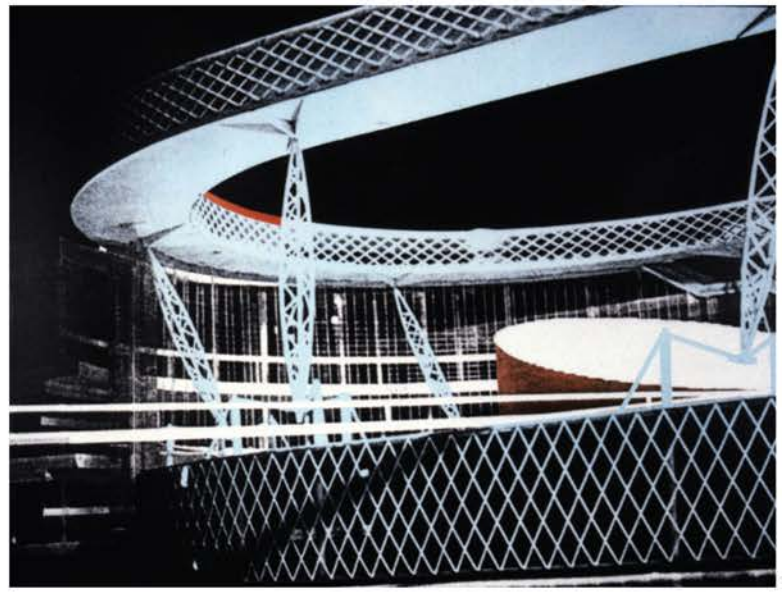

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Figs.50-51: Bernard Tschumi model images.

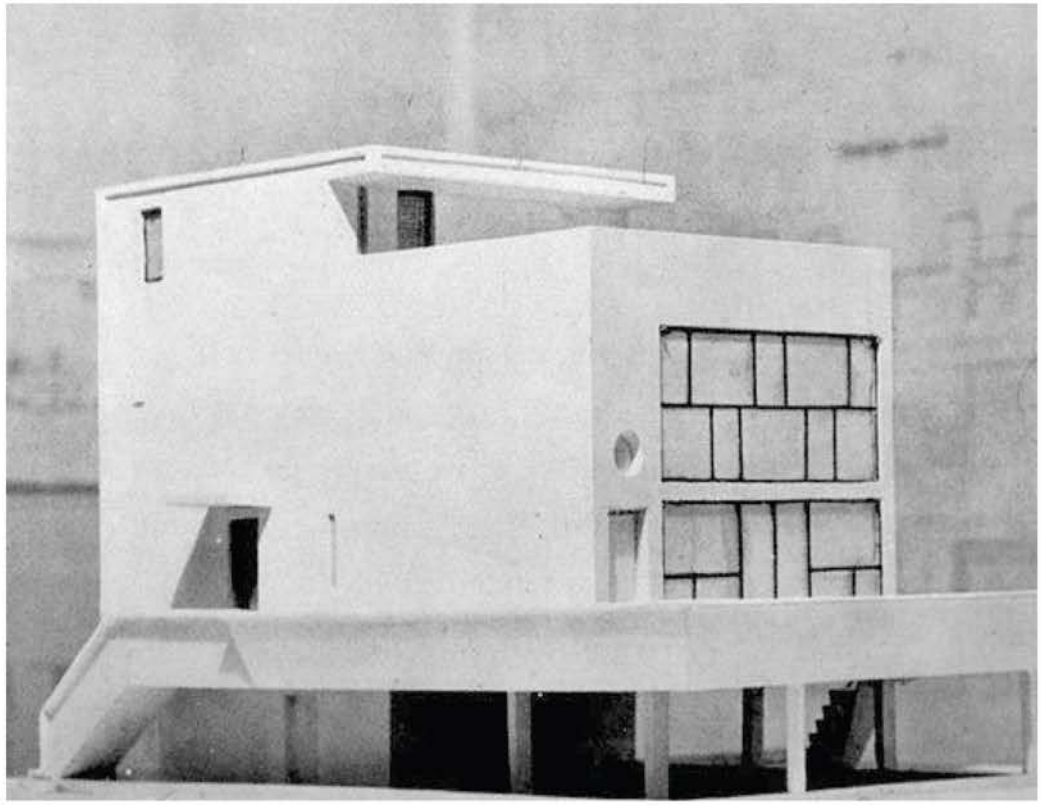

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Fig.52: Maison Citrohan model, Le Corbusier ca.1923.

Fig.53: Maison Citrohan built.

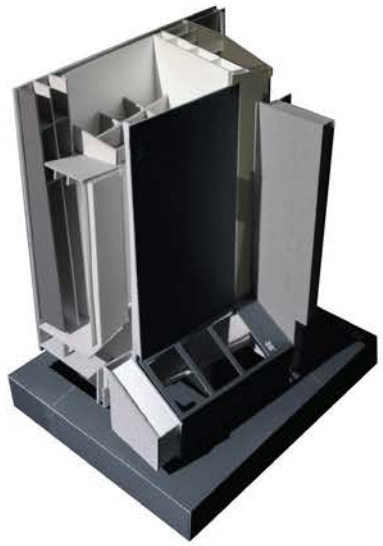
5.3 Model for Maison Citrohan

Lastly, we should refer to Le Corbusier's Maison Citrohan, whose model photograph is often considered to be more renowned than the building itself (Figs.52-53). *'Even when projects were...built, photographs of the models sometimes gained an iconic status that surpassed that of the finished building.'*[76] The famous maquette has been hailed as *'the paradigm for the elevation of the model to the realm of idea.'*[77] The model is a manifestation of the idea, and the building is the debasement of that. Perhaps the model photograph depicts a purer design ideal than the realised structure. This example reinforces the argument that the design process can be just as valuable to the discourse as the building (which in this case is lesser known).

06

BUILDING AS MODEL:

CONCLUSION



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CHAPTER SIX:

'Traditionally the substance of architecture has been the built building.'[78]
Peter Eisenman

Fig.54: Milled model,. Author's own.

Fig.55: Somer's Town Theatre model series. Author's own.

For a student in their formative years of professional development, establishing a relationship to the architectural model is both crucial and lasting. By definition, student-work is a speculative practice, an area where the model thrives and one has license to explore the limits of the model uninhibited as many practitioners are. As such, the model in this instance is surrogate for the building, the ultimate fulfilment of the design, making it particularly pertinent to this discussion. This chapter concludes the thesis by reflecting on personal models to contextualise the findings of the preceding essays, which each focused on a distinct facet of the model's existence.

6.1 Model as Tool of Discovery

In each of these separate modes, the model's role as a catalyst for the imagination has been a recurrent theme. Ultimately the model is an empowering tool of discovery owing to its nature of being a tactile plaything which leads the designer down unforeseen paths the mind cannot forge. As a dispensable toy relieved from practical constraints, it encourages Albertian reiteration and amendment, and establishes a 'Gulliver Gap' within which illogical thinking is necessitated, empowering the designer by temporarily alleviating practical limitations to decision-making. This augments the model's role as an interactive thinking device which encourages continuous reinterpretation of elements, revealing unpredicted spatial and tectonic possibilities as well as enacting its simultaneous functions of both conceptual tool and figurative representation. This adaptability allows elements of the design to remain in different states of abstraction, freeing the architect from premature resolve.

Whilst Agrest's other registers share some of these attributes, the model is uniquely empowering in combining and augmenting the benefits of

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representational and notional objecthood. Furthermore, in contrast to the three individual emerging registers of two-dimensional CAD drawings, three-dimensional virtual models and computer aided physical models, the handcrafted model retains an authenticity uncompromised by digital uniformity. Benjamin's view that '*buildings are appropriated…by touch and sight*' further describes the distinction between virtual and physical models: the former applies to vision only, whilst the latter celebrates haptic materiality.[79] Despite implying the wrong scale and materiality, physical analogue models have the virtue of innately referencing the building's physicality, and they maintain a scalar relationship where virtual computer modelling fragments the building into immaterial framed views which transcend scale. The remaining register, digital fabrication for physical models, defies these drawbacks, offering automated perfection and codes of realism to aid spatial understanding, but we should caution against its elimination of authorship through synthetic uniformity. The handcrafted celebrates Ruskinian ideas of imperfection as referencing time through physical traces of the maker's hand where the others become homogenised.

Bob Sheil has referred to the '*supremacy*' of these digital models and tools as being the future of the profession, but to displace the physical model, when we are discussing two distinct registers, seems flawed.[80] The digital model can challenge aspects of the traditional model, and vice versa, but it is not a substitute. To refer to personal work, Kallio Common, Helsinki, (Figs.56-63) was a speculative scheme where the model was an iterative, generative design instrument. These artefacts begin to challenge Sheil's notion, exploring a hybridised model typology which retains a scalar understanding whilst attaining precision via digital fabrication methods where required. By establishing a combined modelling vocabulary, the resultant objects themselves provoked new, unpredicted lines of enquiry. Here, the intention was for the milling machine to conform to strict codes, each toolpath referencing a known quarrying method whilst building additions were handcrafted insertions of card and wire (Figs.57-63). Digitally fabricated areas were occasionally removed, re-cut and then reinserted as the design progressed in an Albertian manner, repeatedly reworking the object whilst also creating an hierarchy between mechanistic and handcrafted details. This fluid relationship between the two physical registers presented a way in which the digital model might work in harmony with its analogue counterpart. As we have seen, the conceptual model is an intuitive tool, designed to provoke creativity; it does not require mechanistic perfection.

Fig. 56: Kallio Common +Urban Quarry hybrid models. Author's own.

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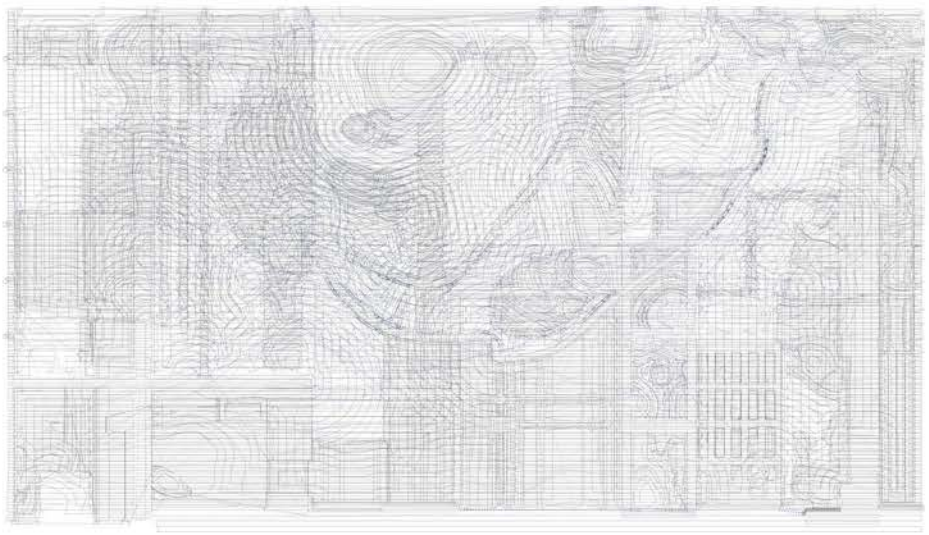

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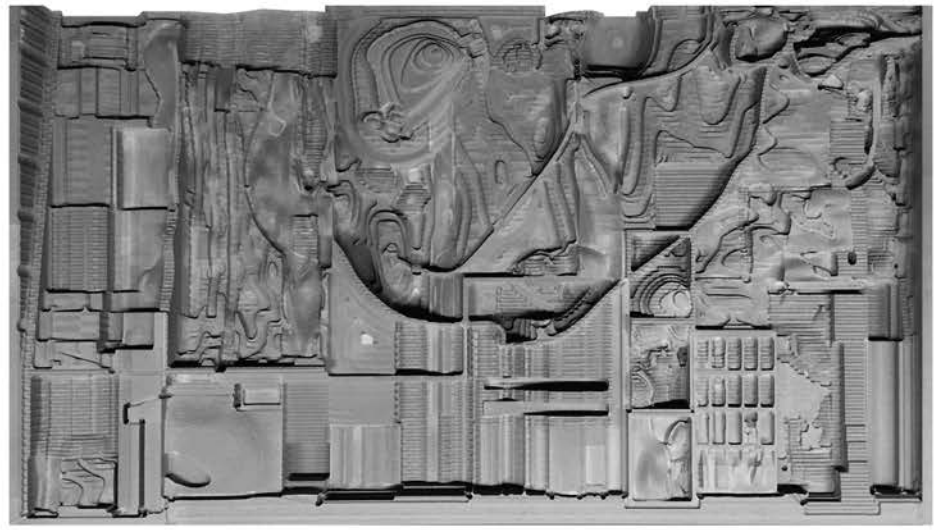

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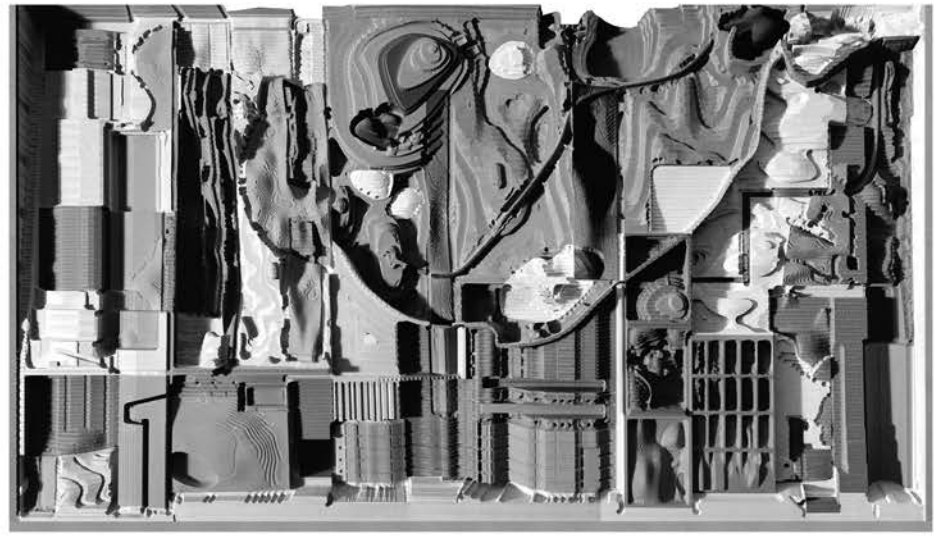


Figure 57-61: Conceptual model series +toolpaths (58) for Kallio Common. Author's own.

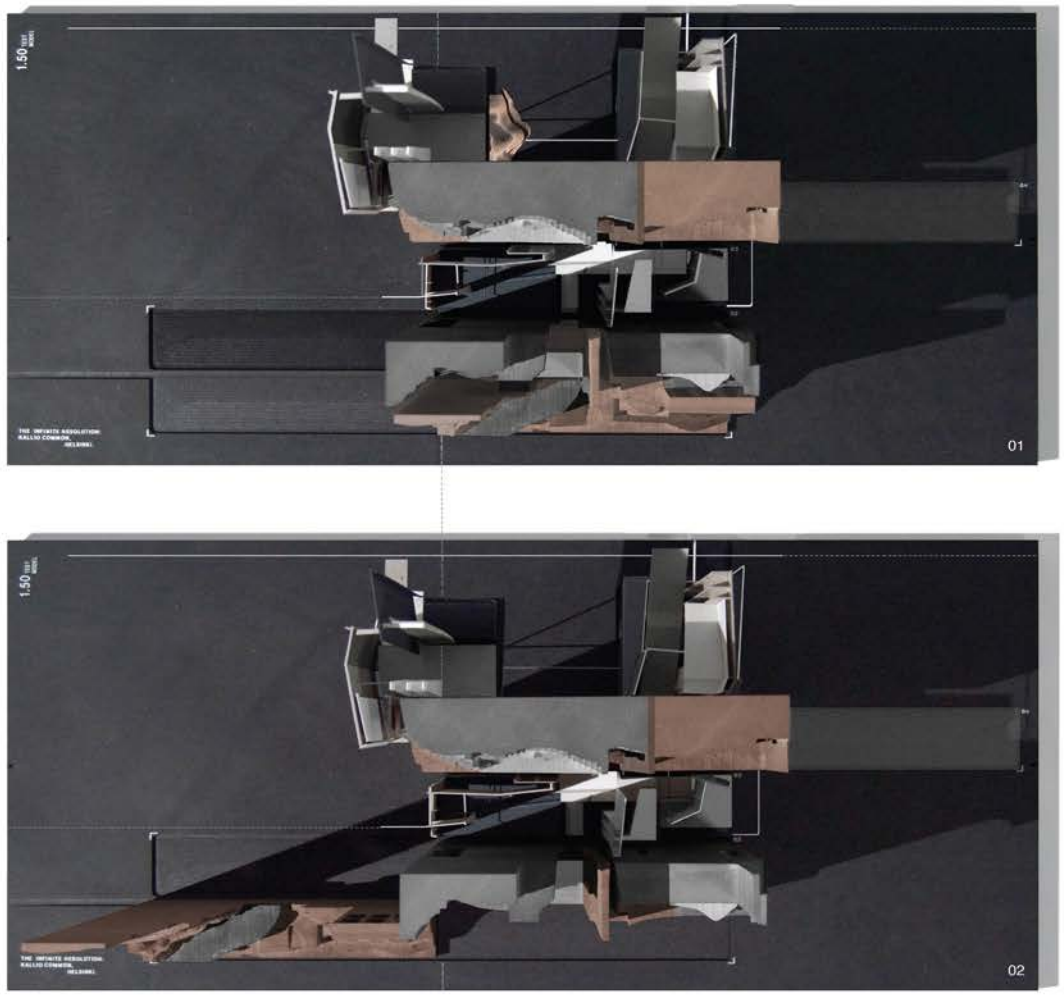


Fig.62: Kallio Common developmental hybrid models. Author's own.

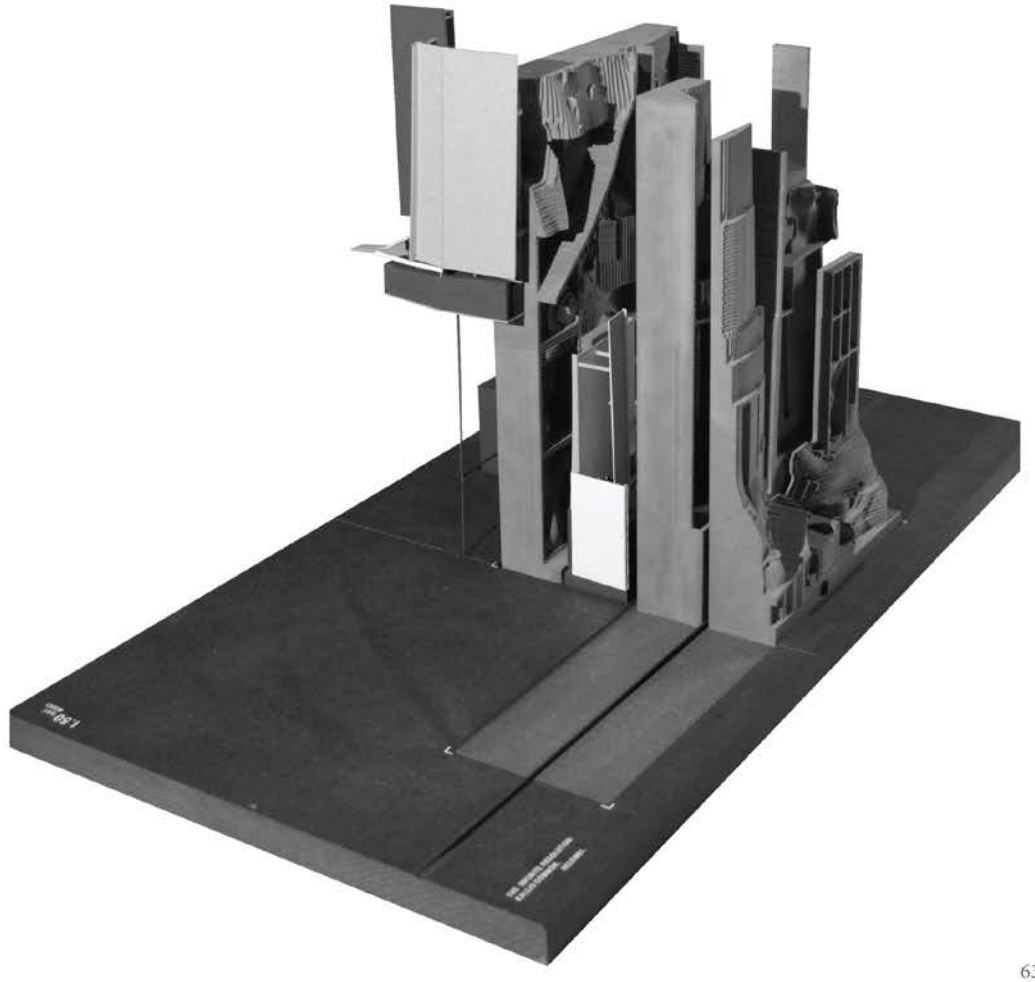


Fig.63: Developmental hybrid model.

6.2 (Model as Building) as Model

As Graves posited, the model cannot not pretend to be an honest representation of the building it precedes: it is an idea of a building, not its reality. However, for the paper architects, the model represented an architectural ideal intellectually sufficient in isolation *'that the idea of built architecture becomes superfluous.'*[81] This opinion could be considered arrogant, but previous chapters have ascertained that the complete building is not necessarily the purest intellectual form of architectural production. Sketch-models impart an illusion of reality and can be the sincerest manifestation of an architectural concept. As Meier once said: *'models are…an expression of the building: often…clearer in their ability to express the intentions than...the actual built works.'*[82] The building, like the model, is just one interpretation of the architectural idea. The main differentiating factors between the two concern scale, occupation, materiality and time. Each iterative model or drawing presents a reworked proposition, with the resultant building manifesting itself as another construal of the drawings.

Perhaps buildings should not be considered the conclusion of the project. Instead, they can be read as an integral part of the architectural process, precedents for future schemes (socially, financially, materially, spatially). The building is not where the project ends, but more critically where its occupation and assimilation into society begins, and where the fourth-dimension of time is introduced. Buildings are architectural ideas realised at full-scale which will go on to manifest themselves again in future models, drawings and buildings. Designers will always maintain a symbiotic relationship between their influences and architectural output, whether those influences derive from buildings, drawings, models or more abstract references. To interpret buildings specifically as referents or refined objects neglects their position in a wider architectural context where they individually contribute to extending architectural vocabularies for practitioners, designers, academics and critics, similarly to the model's generative role in design development. The built architecture can be seen as the most dependable simulation of architecture unlike any

Fig.64: Author's desk

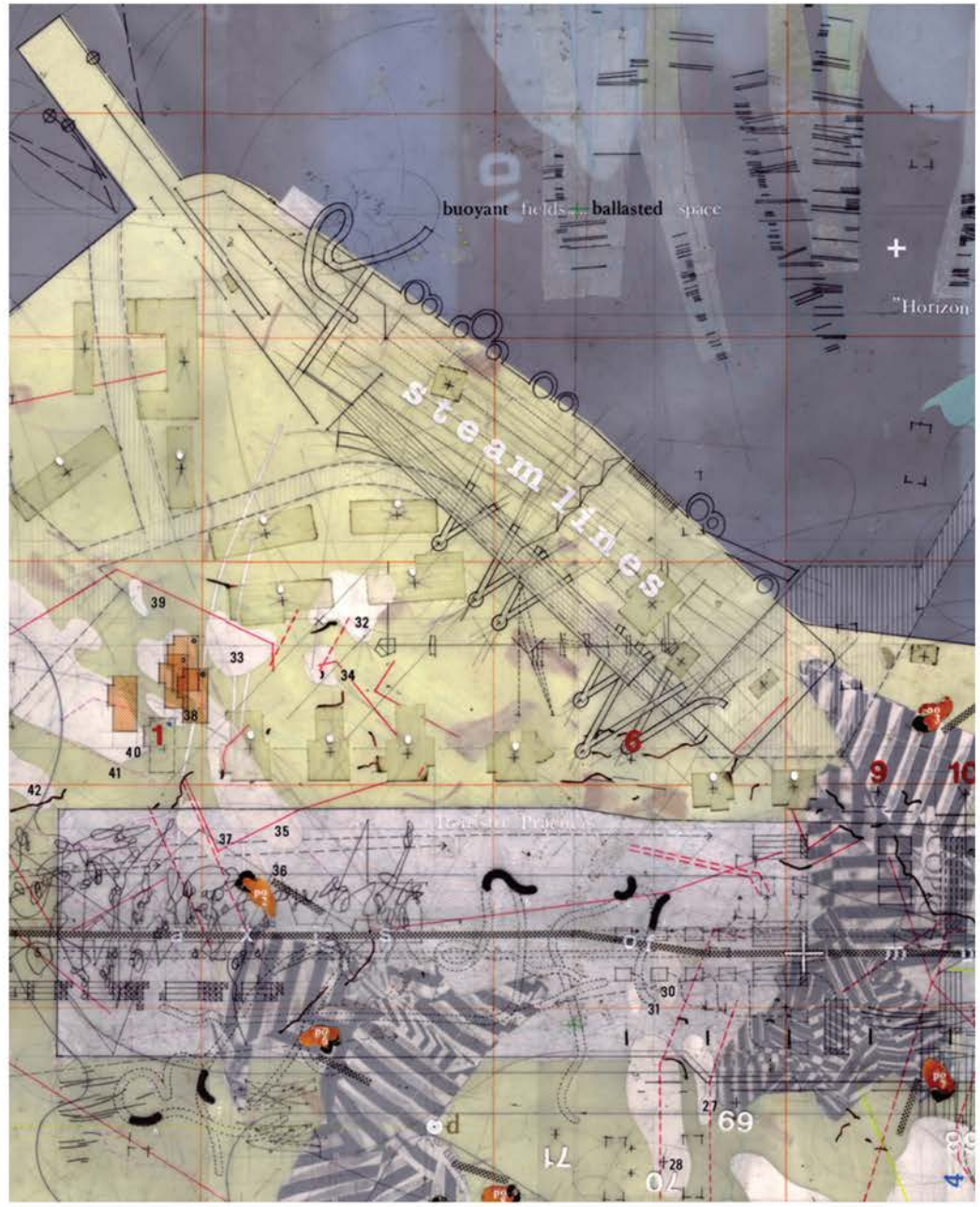
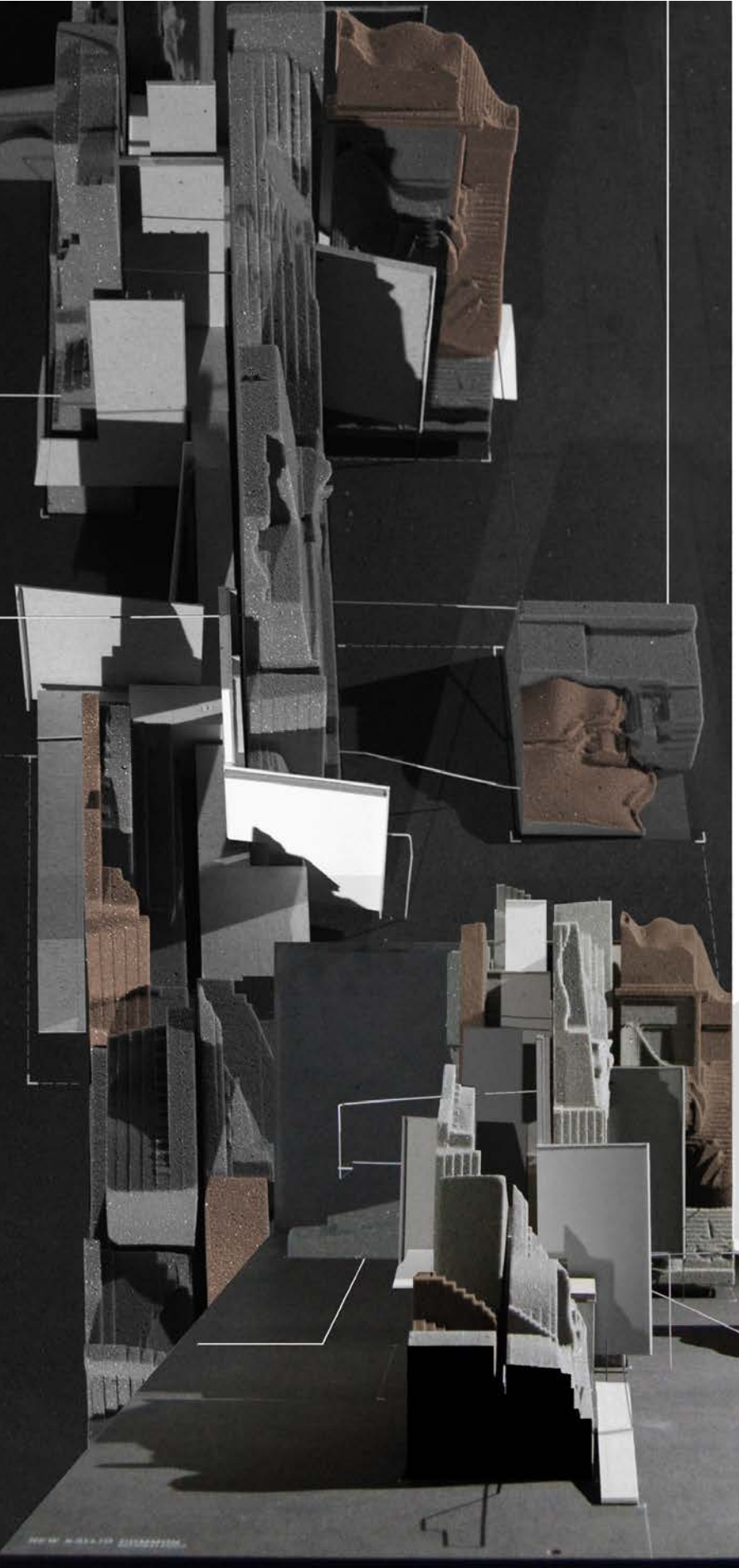


Fig.65: Perry Kulper: Thinking Drawing

model, prototype or computer simulation. '*Buildings too can be seen as representational*'; the building serves as a model for other projects in the same way the architectural model does for its own.[83]

Alberti recognised the model as one of the 'purest' forms of architecture which could offer idealistic representations of architectural intent. To take a personal project by way of example, this was precisely the case. The design progressed through a series of iterative fragment models (Fig.55), addressing the spatial desires for the proposal. As a speculative scheme, the models were never intended for translation into construction. Yet, the first draft of the design, in model form, remained the most honest and intuitive interpretation of my ambitions for the project, even after several iterations, and certainly more so than the associated drawings. The design became progressively more stripped back as the mandatory technical report was undertaken (RIBA S1-4 equivalent) which scrutinised the project's feasibility, and demonstrated how diluted the realised building might have become compared to the initial models.

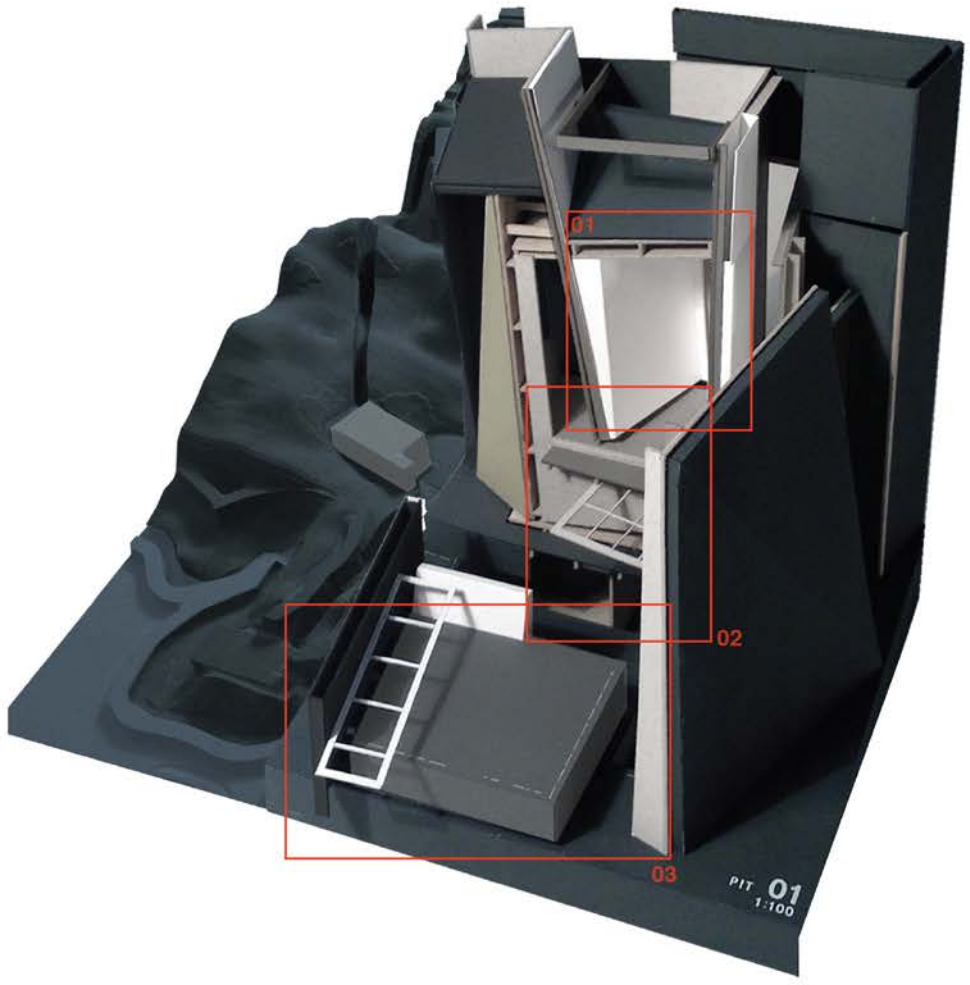


6.3 The Fourth Register of Architecture

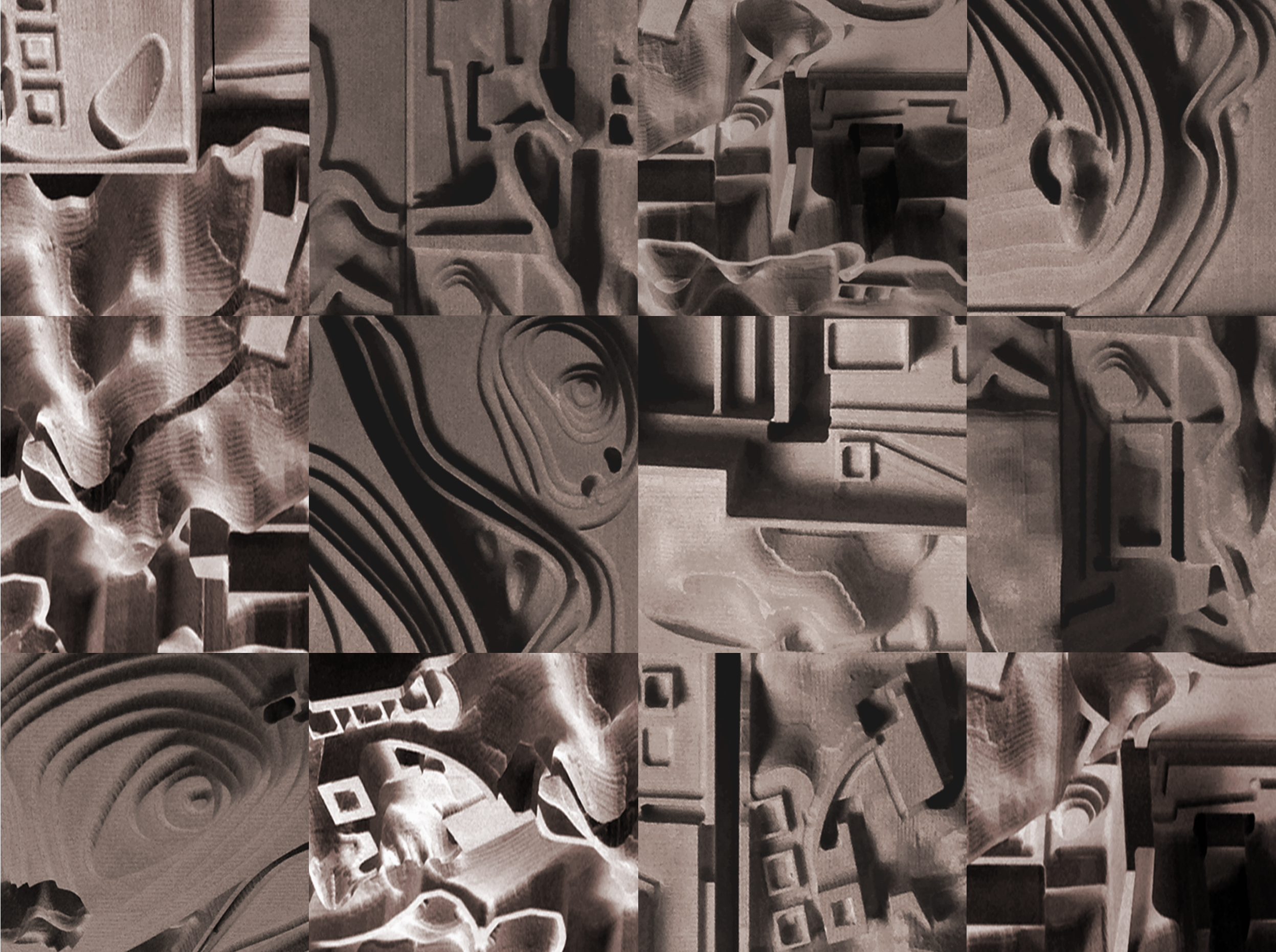
Fig.66: Kallio Common model 1:100.

The contemporary architectural model can rarely be misread. Interestingly with models, one object is presented, but the interpretation of that artefact can be distinct. The drawing, for example, tends to be authored by the designer and issued for construction; it is explicit and dictates the built reality. The model, however, is inexplicit and thus an interpretive tool: the architect can rarely issue a model to a contemporary contractor to build nor can they present it to a client to live in. But the model is lucid, conjuring an image for the patron which transcends scale and a tool for the architect which transcends technical and material data. So, as an interpretive device, it has a degree of ambiguity which is particularly interesting. In contemporary discussions schools like the Bartlett have fetishised the ambiguity of the conceptual drawing: there is a search for a degree of fuzziness as with Perry Kulper's thinking drawings (Fig.65) and yet the model is exactly that, its interpretation is always different.

In opposition to the Beaux-Arts influence which philosophically discredited the model, we can recognise its true credibility within the discourse. Eisenman's *Idea as Model* exhibition was the first of its kind, dwelling on the artefacts of architecture's process, allowing models to elucidate, narrate and comment. We can now recognise them as powerful haptic thinking tools extending the functionality of Agrest's traditional design registers. The model establishes itself as the fourth register of Architecture, an equally valid and universally comprehensible mode of representation in its own right. Initially the use of the model conjures ideas of the totality of the figurative object, but in its physicality it accommodates dynamic shifts and the intuitive reinterpretation of fragments making it a multifaceted tool which should be valued more in the discourse. As with drawing, models straddle a project from conception to conclusion, however the model exceeds the virtues of its contemporary: it has a physical identity, unpredictability and, therefore, self-consciousness. As an object which is considered abstract, not figurative, it is ultimately as important a mnemonic tool as any other representational device or mode of architectural production.



Figs.67-68: Hybridised concept model.



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