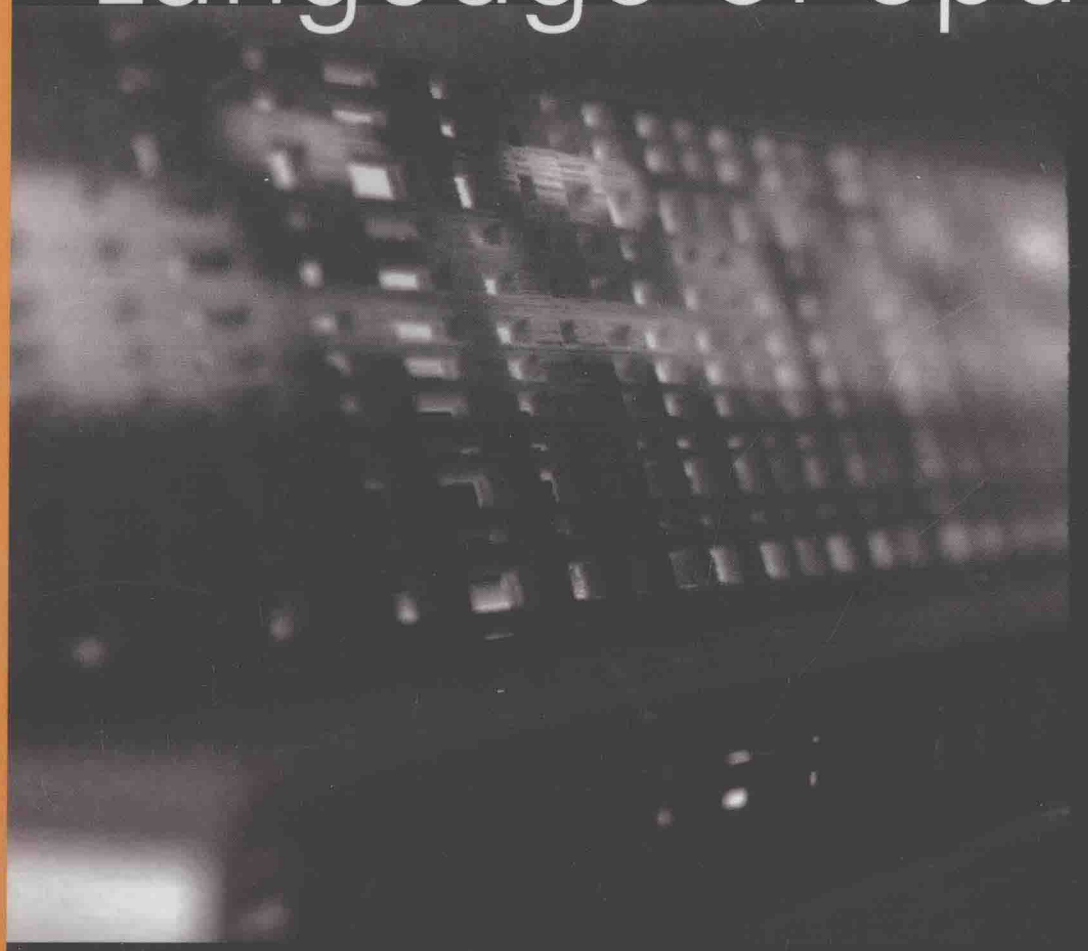
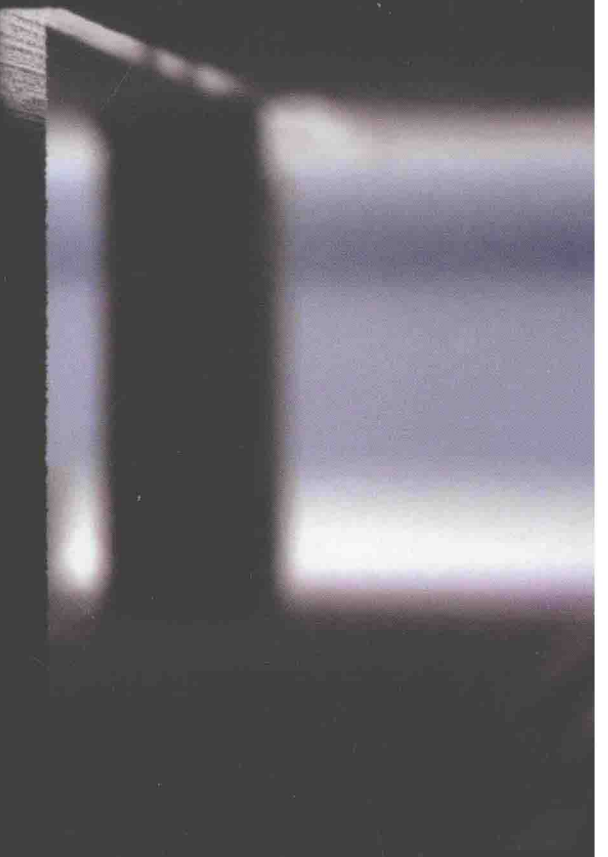
GENERATIVE TERMS FOR ARCHITECTURE

Language of Space and Form





JAMES ECKLER

LANGUAGE OF SPACE AND FORM:

GENERATIVE TERMS FOR ARCHITECTURE

James Eckler

John Wiley and Sons

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INTRODUCTION: ON THE ROLE OF WORDS IN THE DESIGN PROCESS

What is a generative term? And what role does it play in the process of design?

Words are tools for architectural design. They engage each step of the design process—at the conception of intent, the generation of spatial conditions, the representation of elements, and the communication of ideas in a resolved project. In this way, they have the capacity not only to illustrate what has been done but also to generate the ideas that direct what is to be done.

The language of design is not one of identification, but of intention: what something *does* can be more important than what it *is*. This language has the ability to do more than just identify the components that make up our environment; it has the ability to challenge designers to consider the role those components play in the operation of space.

The words presented in this book are used frequently in the architectural design discipline. These words are intended to be a point of departure for two things: discussion and conception. Discussion is an avenue toward realizing the possibilities of design, and conception is a process of thought derived from that realization. It is through discussion (either the exchange of ideas among peers, or the introspective questioning of one's own ideas) that the possibilities presented by various techniques, elements, or positions in architecture can be considered in the development of space. This is the foundation of architectural conception. These possibilities define a framework for study and testing. They also provide a trajectory for advancement through an iterative process of making. A word can define an intention for spatial operation or experience, a strategy for the development of spatial systems, or a technique for testing spatial qualities. The language of space and form is a language for architectural thinking.

How can a term be used as a design tool?

The terminology of design acts as a tool for the development of design intent or strategy. The language of space and form is a language that allows a designer to read and understand space, as well as to construct the ideas that drive its creation. The language of space and form is generative in that it does more than describe architectural gestures: it has the potential to be a foundation for their invention. A generative term is a catalyst for thought and inquiry, for exploration and discovery. A generative term is one that opens up possibilities for design and frames an intention for making space and crafting form. A generative term is a starting point—a position on what the architecture should be.

This book divides terms into five facets of architectural thinking: process and generation, organization and ordering, operation and experience, objects and assemblies, and representation and communication. These categories are not ordered to describe a sequence for the design process. Instead, they are to be considered, more often than not, as overlapping or interdependent. For instance, generative strategies can rarely be used independently of an ordering system to define limits. These categories become useful as a means of codifying design intent—for defining a role that a particular word might play in your own way of thinking about design. They speak to the various ways architects think of space and its creation, from the acts of thinking and making to the reading and interpreting of existing spaces. They are codified this way to act as guide for the development of the design process. Each word is a starting point for imagining and developing ideas for creating form and space.

The **process and generation** terms outline modes of thought or ways of making in the creation of form and space. For a designer, thinking and making go hand in hand. With that in mind, many of these terms will describe techniques for making that might be used to frame a process

of thought. Others may refer to an intellectual strategy as a guide for the making of space. Use these terms to articulate a goal or intent for the space that is to be designed, or to formulate a strategy by which that goal can be achieved.

The **organization and ordering** terms refer to strategies for inventing relationships between forms and spaces. This could be a system for deciding which elements are more important than others in a design. Or it could be a system for arranging spaces, functions, or form to achieve a desired outcome. Terms that define techniques for organizing elements of a design can also bring clarity or resolution to an idea. Use these terms to define the ways in which different elements of a design might interact with one another—physically, spatially, or functionally.

The **operation and experience** terms describe ways that an occupant might perceive or interact with form and space, as well as design intention for creating spaces that facilitate that perception or interaction. These are the descriptors of architecture's ability to engage the senses. They define the influence that sensory experience can have over design process and intent. Operation and experience represent specific aspirations of architecture. They have the potential to be catalysts for both thinking and making. They can direct the design process by establishing a set of conditions to be created in space and form. Utilize these terms as descriptors to generate the intent of a project, or even a single space. Use them as a way of directing conception of space as well as a means to evaluate results.

Objects and assemblies terms refer to strategies for the use of physical elements to construct or define space. These terms define formal typologies and form-based strategies for design. Additionally, they address joint-making and object relationships as components of the design process. Use these terms to describe the influence of formal qualities on the creation of space. They may also be used to explore the many possible roles that a joint might play in the creation of space, possibilities that move beyond the act of connecting one object to another.

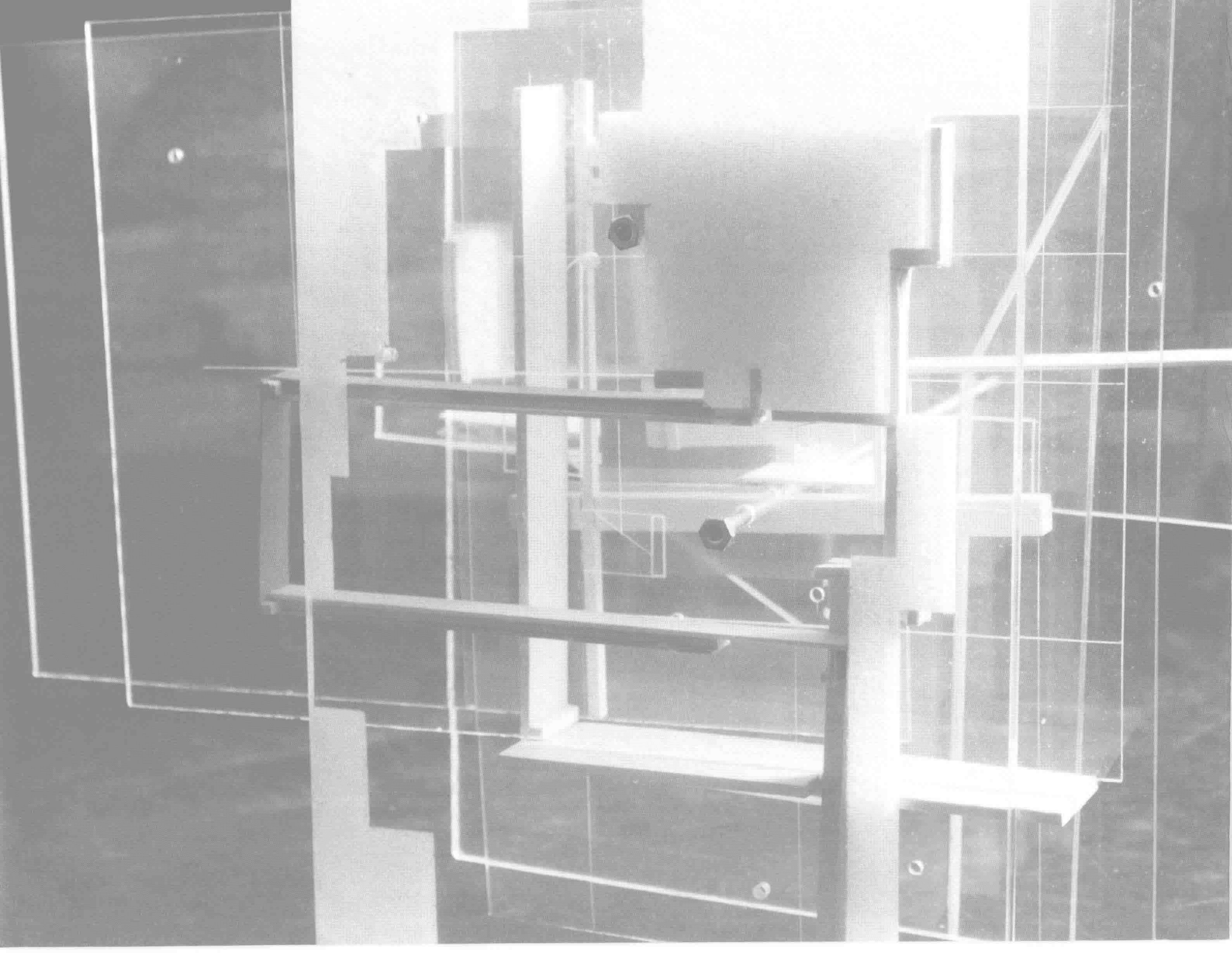
The **representation and communication** terms present possible ways in which ideas of space and form are communicated through the act of making. These terms address the communication of ideas as a connection between the ways that form and space is understood and the ways that it is made. Use these terms to guide production of design so that in making space, you might better understand that space.

Process goes hand in hand with speculation. Questions test the possibilities of space, experience, operation, and construction. Questions lead the designer to discover what something *can be* instead of identifying what it *is*. A generative term is not a static definition, but a starting point for that speculation. Preconceptions in the reading of the built environment are undone through critical speculation. In keeping with this spirit of exploration and discovery, the words and categories presented here are by no means canonical or absolute. In many cases words may fit into multiple categories, as there may be multiple potential roles for them in a design process. In those instances other possibilities for the term are suggested.

There may also be (and should be) possibilities for a term that are not addressed here. There may be other categories, or subdivisions within a category, that evolve as students better understand their own way of thinking. To this end students should add their own notes, sketches, or additional entries to this text. This document, as well as the techniques and thoughts described within, should evolve with the student. New applications of a word to the process of making or conceiving of space should be recalled in later design efforts. As discoveries are made that relate to a word, they should be recorded for later use. This expansion in the understanding of a word's ability to be applied to the generation of architecture is important to the advancement of a designer's architectural process. Generative terminology is a guide for exploration as opposed to a reference to static preconceptions. Language is malleable.

This book is a guide for the development of design process and intended to follow students as they advance. It is a studio companion through the foundation levels and beyond. Every entry has multiple stages of information regarding the word at hand in order to engage students at multiple points in their academic careers. The entries will contain the definition of the word in the strictest sense in order to link the term to the common, conversational use that a foundation student might reference. Additionally, each entry will present a short narrative, and many are supported by images of student work to begin the process of exploring possibilities for that word in design. The images presented are those from design students in their first or second year of design studio education. They are meant to illustrate the use of the term as a design that other students can readily understand and access. Each entry will also have a text that will guide students in more advanced investigations of the term as they move beyond the foundation levels of design.

It is intended to provide additional inspiration for continuing to test ideas related to the term, its connotations, or its previous manifestations. Principally, this is a field guide for architecture students, allowing them to explore new avenues for their creativity. These generative terms will become tools, among many others, that students will develop for conceiving and interpreting architectural space. Those tools will open up many possibilities for creating architecture. Generative terminology will contribute to a more versatile process of design.



1. TERMS OF PROCESS AND GENERATION

ABSTRACT

To represent a subject in a way that is not pictorial or responsible for documenting its actual existence

Abstraction: An interpretation of a subject based upon a study of particular characteristics

Generative Possibilities in Non-Figural Representation

The drawing was an abstraction of a real subject—in this case, the plan of a building. It didn't look like the building; it didn't seem to conform to the image of the building at all. Instead, it revealed how the designer was thinking about the structure. The intention behind its composition seemed to be to study organization or spatial relationships. Abstraction was used to document a process of thought that ultimately led to a new design. Even though a casual observer might not be able to understand it entirely, it was a useful tool for the designer, a tool used to understand the old and to create the new.

The origin of the word *abstract* is the Latin *abstractus*, which means "to draw away." To make something abstract is to represent it in a nonliteral way: to deviate from the actual. Everything that designers produce, from conception to the development of a design, is a form of abstraction. Drawings, models, and diagrams reduce a reality into a representation, and therefore an abstraction.

How can design benefit from representation that moves away from actuality? Since each stage of a design process is an investigation that tests possibilities of space and form against a generating idea, abstraction is a means for defining the scope of the study. For instance, abstraction might be used to focus the study on one particular idea, composition, or set of relationships; it may be used to spotlight typology, configuration, or function, or to define a language for representing any of the above. It is a method that has the potential to exclude superfluous information so that the subject of study is not diluted in the information that is gained. As a method, it is able to frame a process of thought in a way that facilitates iteration. It is a way of simplifying complex information sets, or focusing a study on information of particular relevance.

Through abstraction, a designer might be able to recognize possibilities that were previously not considered. Those discoveries drive subsequent investigations, which is the foundation of an iterative design process. When a representation is not abstract—that is, when it is figural—capturing the reality of the subject becomes a goal unto itself. That finality has the potential to limit discovery and undermine the iterative process.

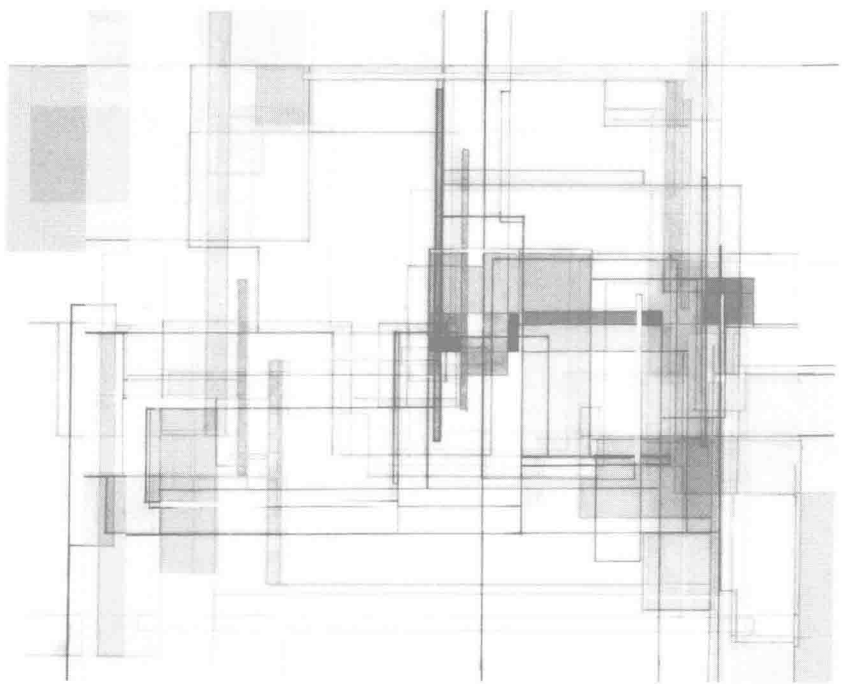


***Figure 1.1.** In this analytical mapping the student uses abstract graphic language to indicate relationships between elements of a composition. Components of the subject of analysis are reduced to orthogonal figures (an act of abstraction) in order to more easily identify relative position, alignment, overlap, and other instances of compositional relationship.* STUDENT: TAYLOR ORSINI—CRITIC: JOHN MAZE—INSTITUTION: UNIVERSITY OF FLORIDA

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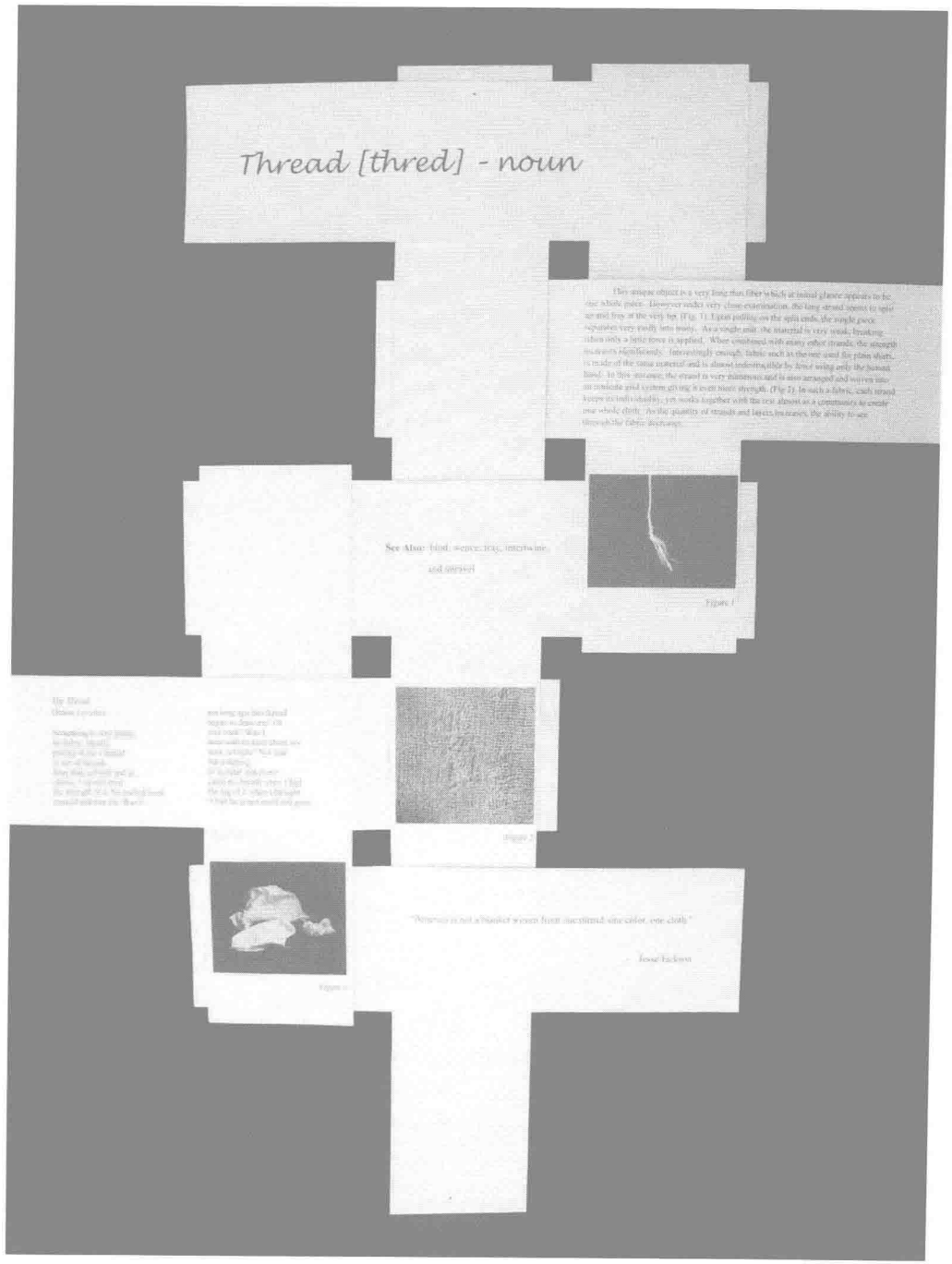

Figure 1.2. This is a presentation of information gathered through research. The information is composed in a way that reflects its role in the design it is to generate. In this case, information about form and material are abstracted into a method of assembly specific to the topic of research. This frames a point of departure for further design investigations. STUDENT: BART BAJDA—CRITIC: MATTHEW MINDRUP—INSTITUTION: MARYWOOD UNIVERSITY

ADDITIVE

A strategy of making characterized by accumulation

Generative Possibilities in Accumulation

Faced with a challenging and complex integration of spaces, each holding a different event, the student decided to employ an additive strategy for making. She did this in order to definitively articulate each space without changing the tectonic language that she had established earlier in the design. She continued to accumulate elements that defined each space and the joints between them until the density of components became confusing. Spaces began to lose their distinction, and the assembly of parts began to lose its rationale. At that point she began a subtractive process to edit the design. Her goal was to discover that perfect moment when the accumulation of components allowed each space to be distinct but still an integral part of the larger spatial composition.

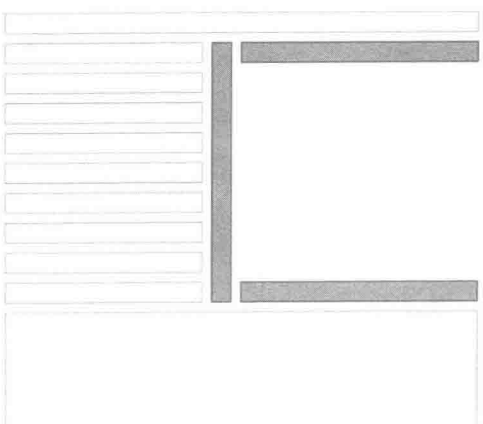

***Figure 1.3.** This shows how one might build up a component through an additive way of making. The single component is actually an assembly of much smaller parts. The opening to the right of the assembly is achieved by altering the size and configuration of elements rather than cutting away at the component.*

Addition is a simple process that allows a designer to quickly iterate a design through intuitive decision making. As more and more objects accumulate, it becomes possible for progressively more ideas to be generated. This strategy for iteration fosters discovery; however, using it, the designer may become preoccupied with the forms that define a space, rather than the space itself. In

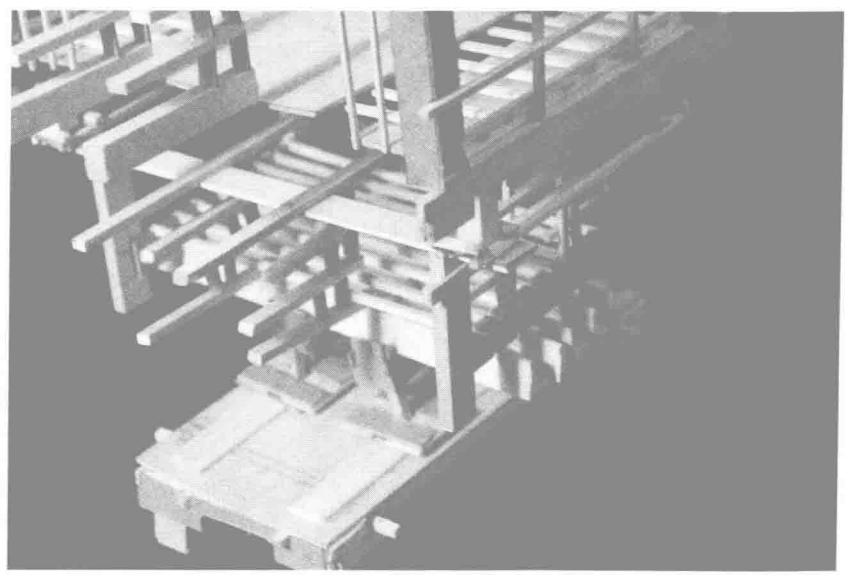

***Figure 1.4.** Additive making can be a strategy for assembly. Crafting intricate joints between many elements can provide opportunities for the design of the spaces they contain. It might be a way of affecting the space by filter light or providing access. It might also be a way of communicating relationships between parts through physical connection.* STUDENT: DAN MOJSA—CRITIC: REAGAN KING—INSTITUTION: MARYWOOD UNIVERSITY

that instance additive making is gratuitous and possibly a distraction from the primary design objective. It shifts the focus of the design process away from making spaces and toward a preoccupation with craft and objects.

In what ways might this, as a method, propel a design into another level of resolution, or begin the next iterative step? As a preliminary design technique, it could be employed to discern variations in spatial composition as described in the narrative. Or it could be used to develop a tectonic language for the communication of spatial information that can be employed in future iterations of a design. In addition to this strategy for making through accumulation, it can also describe a strategy for making at a smaller scale. Individual components or elements to be layered or built up can be developed through additive techniques. This contrasts with the subtractive carving of large pieces to create individual components. The additive and the subtractive speak to the difference between the tectonic and stereotomic methods for crafting.

» *See also* Subtractive.

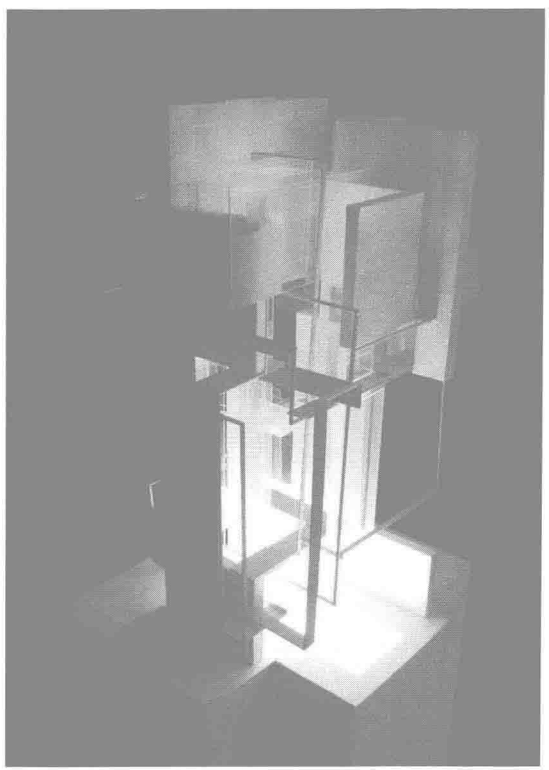

Figure 1.5. Additive making can also be a strategy for the configuration of space. Different materials can foster control over inhabitants' perceptions; the intricate assembly of elements can foster precise control over the configuration of spaces they contain. STUDENT: JOHN LEVI WEIGAND—CRITIC: JOHN MAZE—INSTITUTION: UNIVERSITY OF FLORIDA

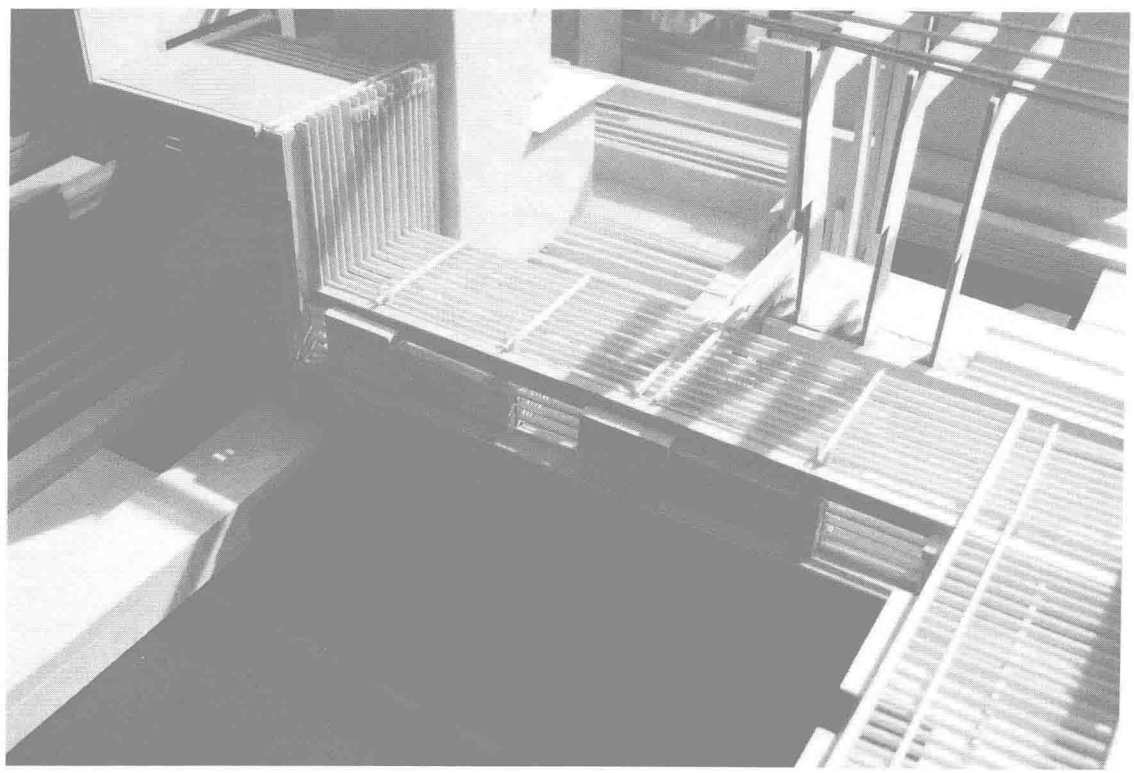

Figure 1.6. Additive assembly furthers control over the play of light in space. These techniques of assembly also establish a hierarchy through the size and configuration of elements. They help communicate a scale through the relative proportion of elements to the spaces they contain. They also communicate organizational logic by indicating direction, a relationship to other elements, and patterning. STUDENT: LIU LIU—CRITIC: JAMES ECKLER—INSTITUTION: UNIVERSITY OF CINCINNATI

ANALYSIS

The process of separating a complex subject into constituent parts so that each part can be studied independently

Generative Possibilities in Investigation and Inquiry

An architect has just received a project about which he is very excited. A couple who purchased an older, historic house has asked him to design an addition that preserves the character of the original structure.

Before design can begin, an extensive study of the existing conditions has to take place. The architect begins by analyzing the site, breaking it up into several categories of study: dimension and topography, existing site features, adjacent buildings, and public access. The addition will have to respond to the existing spatial composition of the house, so he analyzes circulation, program, and degrees of privacy. The new addition also has to respond efficiently to the environment, so he analyzes it in relations to daylight, solar orientation, and climate. All of these studies enable him to conceive of a design strategy through synthesis. The product of that synthesis is a single diagram that incorporates the information gained from each individual study into a spatial composition. He uses that diagram to develop the first set of process drawings and models.

Analysis is a type of abstraction in which a designer is able to isolate pieces of information from a more complex set of issues. Those isolated parts can then be more effectively studied. The primary goal of analysis is to generate information of something particular. How is the process of analysis generative? How does it generate information? How does it generate design?

Documentation is often confused with analysis. One might note the direction of the wind across a site; that is documentation. But studying the impact that wind might have on a design is analysis. Similarly, mapping the program in a building is not in itself an analysis because there is no study or generation of knowledge. But by mapping the programs of a building relative to the number of people inhabiting its spaces, the building's actual primary function might be determined. From this information new ideas for augmenting that building might be conceived. Analysis facilitates learning as a form of research and inquiry. Analysis generates new information as a function of design.

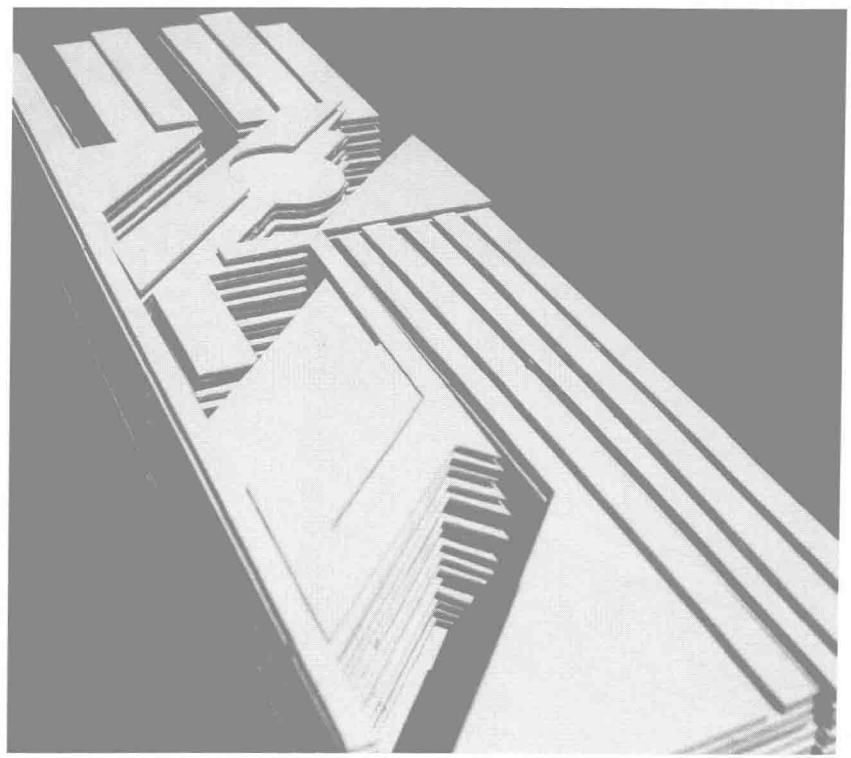

Figure 1.7. Components of a precedent building are analyzed to discover the ways in which they are related through both formal and spatial connections. In this analysis, the building is reduced to a set of interrelated systems. STUDENT: ELIZABETH SYDNOR—CRITIC: MILAGROS ZINGONI—INSTITUTION: ARIZONA STATE UNIVERSITY

This is important to the design process, as it is often a vehicle for iteration. Analysis presents new possibilities for design as new information is generated. Discovering how far daylight penetrates into a space might lead to testing other design variations of an edge. An analysis of program as it impacts the arrangement of the new spaces in the previous example will lead to testing new methods for organizing and distributing the functions of the new design. The importance of analysis to a design process—especially when coupled with a synthesis of parts—lies in its ability to define limits for experimentation and measurable criteria for success.

» *See also* Synthesis.

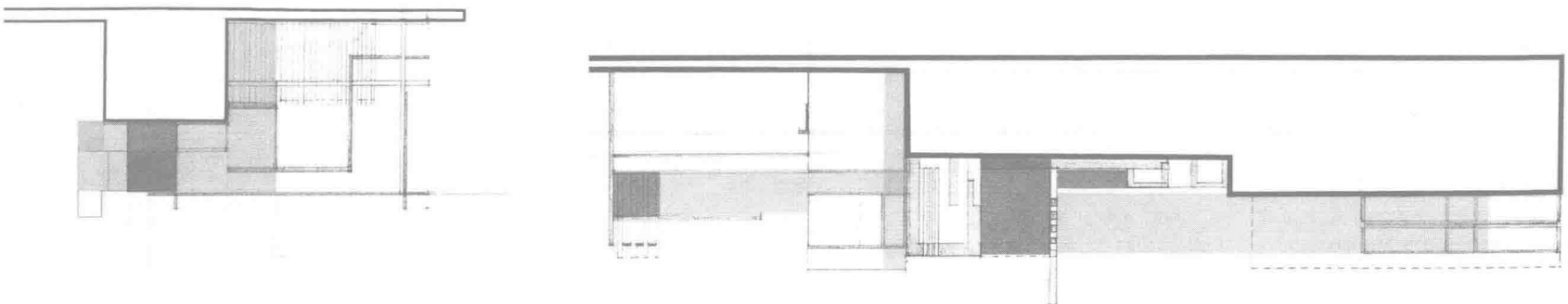

Figure 1.8. Analysis is a form of research and inquiry that relies on the separation of a complex system into its constituent parts. In this case the student investigates multiple spatial functions within her project. This analysis yields compositional information regarding spatial relationships relative to tectonic assembly. STUDENT: MICHELLE MAHONEY—CRITIC: JAMES ECKLER—INSTITUTION: UNIVERSITY OF CINCINNATI

COMPOSE

To arrange the parts of a whole

To physically relate elements

To configure space or form through making

Composition: Any instance of arrangement, relationship, or configuration

Generative Possibilities in Configuring Elements

She made a set of models, each one in accordance with the requirements of a single function within the program. She had resolved the details specific to the various parts of the program, but she realized that she didn't know how the parts should relate to one another.

So she sketched out strategies for positioning the parts relative to one another. From those sketches she started to arrange the parts. She would place one next to, on top of, or interlocked with another. She would continually reposition parts, sliding one a little along the surface of another, or rotating a part in minute intervals. Through the composition of parts she was able to define the relationships between aspects of her project. The act of arranging generated ideas for the way in which parts would be linked together.

Composition consists of a set of principles that direct the positioning or arranging of elements. The compositional act occurs any time two or more components are arranged, and it is fundamental to architectural thinking. It is present in the processes of formal assembly and defining spatial relationships. Compositional principles can also be employed in documentation, analysis, and representation. Composition influences nearly every aspect of the architectural design process. One space cannot be related to another without relying on compositional logic to position them relative to each another. Composition is therefore inherent to design, whether it is a product of design intent or merely an afterthought. Compositional principles can be used as design tools; they inform decision making by providing criteria for relating elements.

If principles of composition are used throughout the process of design, how can they be specifically applied to individual goals? How can compositional principles be used to define particular methods within a process if it is

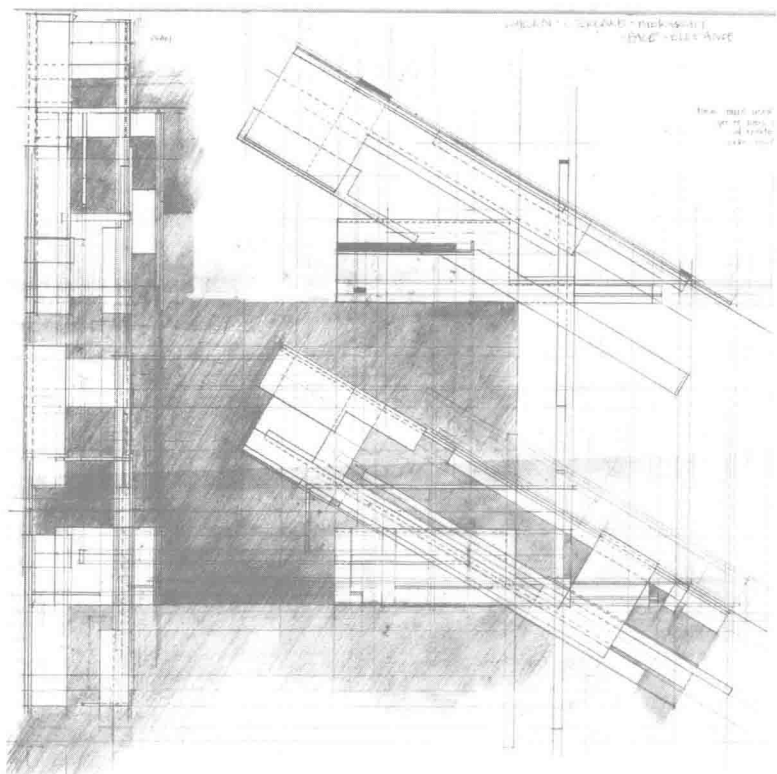

Figure 1.9. Composition is the adherence to a set of guidelines that allows us to determine relationships among components. Here composition is used to further the communication of spatial and formal configuration. Plan drawings are correlated with section drawings in the way they are composed relative to one another. Registration lines reinforce the correlation and specifically reference individual elements of the project. STUDENT: ASHLEY ELDRINGHOFF—CRITIC: MICHAEL HAMILTON—INSTITUTION: LOUISIANA STATE UNIVERSITY

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