Graduate Theses and Dissertations   Graduate School

3-24-2010

PLAY: A Process-Driven Study of Design Discovery

Kuebler Wilson Perry
University of South Florida

www.manaraa.com

PLAY

A Process-Driven Study of Design Discovery

by

Kuebler Wilson Perry

A thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Architecture
School of Architecture and Community Design
College of the Arts
University of South Florida

Major Professor: Steve Cooke, M. Arch
Mark Weston, M. Arch
Stephen Szutenbach, M. Arch

Date of Approval: March 24, 2010

Keywords: fabrication, toy, education, making, digital

Acknowledgements

 Firstly, I would like to extend my sincerest gratitude to my sister Kate, who has been a constant source of inspiration, perspective, and counsel. Without her support as both family and friend, I would have travelled the darker hollows of this road alone, with nothing to light my way.

 I would also be remiss in forgetting Daryl Croi, whose constant tutelage and presence as a design sounding board has greatly enriched my time in school. He has been a tremendous friend and resource, both for critique and life wisdom in the way that only experience can teach. Stephen Szutenbach, only graduating a year before me, has proven to have wisdom and sophistication of thought well beyond his years and my own. His scholarly steering has greatly enabled me to clarify my own thoughts, and to choose the next best move, time after time. I must also salute Mark Weston, the great enabler. His enthusiasm for exploring the outer edges of what architecture might be has galvanized me to push forward with this study. He also seems to have a knack for getting excited about whatever the student is excited about, a rare quality in academia.

 Lastly I must thank Steve Cooke. Steve has taught me how to think about architecture, and more importantly, how to teach myself. It is an educator's highest calling to cultivate and eventually bestow this gift upon a student, and for me, Steve has succeeded where so many fall short. I must also thank those I have not mentioned, fellow students, friends, and family, for their patience, encouragement, and humor.

Dedication

This manuscript, in fact, the last four years of effort, are dedicated to my grandfather, Jack Zimmerman. He was a newspaper man, a musician, and a friend. Sadly, he was only around long enough to kindly smile on the silliness of my childhood, and won't be here to laugh hugely at the silliness of my adulthood. If I fall short in emulating him, I will still be pretty good. It doesn't seem an important lesson to teach a child to draw airplanes, but for me, it has been the most important one.

Table of Contents

List of Figures

List of Figures Continued

PLAY

A Process-Driven Study of Design Discovery

Kuebler Wilson Perry

ABSTRACT

Frequently, in architecture and in other professions, a results-oriented approach to design truncates the creative process. Architecture is a man-made intervention, ultimately involving a fair bit of destruction in order to eventually arrive in a state of hopefully coherent grace in the lives of its users and the built or natural context (Clark 2000, 10). It is unacceptable to proceed hastily into such complex territory-without a degree of rigor and process-driven creativity commensurate with the gravity of creating large scale, reality-altering, life-affecting structures.

A process-driven inquiry requires many hours of experiment, revision, and meandering about that may initially have no relevance to any project at hand. It is time spent playing that produces creative designers, and it is creativity that we profess to provide for people. The designer that only picks up a pencil while on the clock, and walks past a stack of Legos without any urge at all to pick a few up and toy with them has lost his or her way. A re-introduction of play in the processes of designers, architects, and other creative professionals is vital to our continued place as contributors in the interest of a better world.

This study seeks to illuminate the non-linear, to give play a respected spot as a design strategy. Play leads to better ideas, and toys lead to play. This will be a chronicling of one person's journey, through a play - based design process, in order that we may better understand how play fits into an inquisitive and productive design methodology.
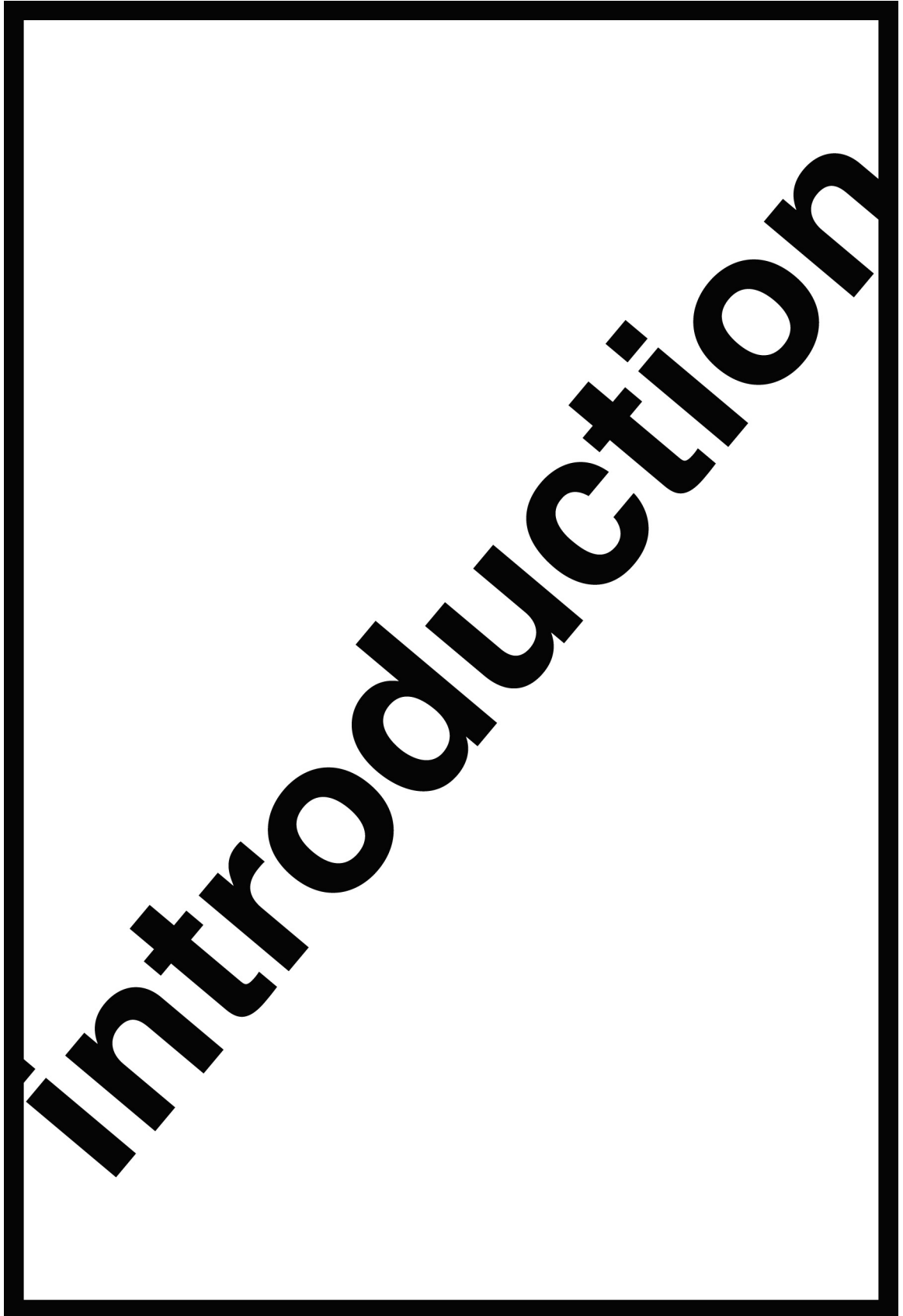
Fig. 1.　introduction

As architecture is first concerned with habitation, second with everything else- a study of design requires concentrated focus on the humanistic, the social, contextual, and experiential. Simultaneously, architecture must strive to address human needs in unique ways, as it is a complex organism- distant from the poignant normalcy and simplicity afforded an apt stepladder, or an unassuming carrot peeler- so effective that its beauty lies in its unnoticed efficiency (Morrison 2007, 102). Architecture is a man-made intervention, ultimately involving a fair bit of destruction in order to eventually arrive in a state of coherent grace among the lives of its users and built or natural context (Clark 2000, 10). It is this complexity that bestows upon the architect a great responsibility, this complexity requires maximalism. It is unacceptable to proceed simply into such complex territory - while the zenith of a project may initially present itself as a delicate and minimal balance - further investigation should reveal a degree of rigor and complexity of process commensurate with the creation of a large- scale, reality-altering, life-affecting structure.

In order to properly address these needs, the architect may employ any number of methods in which he or she has been trained, or apply various logics and approaches in an effort to best serve the final recipients. Before these myriad tools can be effectively wielded by a designer- he or she must be proficient enough in the method to approach design problems confidently, even fearlessly. Often this training must involve tangential investigations of a decidedly non-humanistic nature, with little relation to an ultimate user experience. Intense study in any number of related subjects can engender a knowledge base of differing and sometimes unrelated contents. These layers of knowledge, melded with discoveries made during experimentation and alternate paths taken, provide the designer with a more varied palette from which to draw as he or she addresses the unique complexities of building for a human world. It is this type of tangential learning that can ultimately serve designer and client on a higher level than a study of habitation alone. A designer can then approach design with a process or set of tools that enables rigor in each instance of design.

Stanford Anderson, as quoted in The Architecture Machine, by Nicholas Negroponte:

"Rather than "problem-solving," I characterized the design process as "problem-worrying." I suggested that architecture is concerned with structuring man's environment to facilitate the achievement of human purposes (intellectual, psychological, and utilitarian) where those purposes are incompletely known and cannot be extrapolated from what is given in the situation. Rather, human purposes are altered by the very environment that is created to facilitate them. The structuring of the environment must be accomplished, then, through the exercise of tentative foresight and the critical examination of that foresight and the actions to which it leads. According to this description, neither the human purposes nor the architect's methods are fully known in advance. Consequently, if this interpretation of the architectural problem situation is accepted, any problem-solving technique that relies on explicit problem definition, on distinct goal orientation, on data collection, or even on non-

adaptive algorithms will distort the design process and the human purposes involved."

Stanford Anderson,
"Problem Solving and Problem Worrying," (Negroponte 1970, 119).

Again, "According to this description, neither the human purposes nor the architect's methods are fully known in advance," (Negroponte 1970, 119). This requires a varied, non-linear approach to the study and practice of architecture. Each project differs uniquely from those that have come before or will come after, but the knowledge base can be scale-less, diagrammatic, and consistently re-useable. In the Atlas of Novel Tectonics, Jesse Reiser discusses the scale of the diagram, first at a micro and macro-scale- where a similar form could produce fairly conventional results at either pole, however in the midrange of scale, that of architecture- somewhere between landscape and clothing, the same treatment becomes more interesting (Reiser 2006, 120). Here we can begin to think of the generic, the boundless applications of a diagram as it sits in a toolbox of possible solutions. When a designer begins to understand the generic, the idea of mere relationships as opposed to the concrete ideas of plan, section, wall, beam- he can more nimbly navigate his skill set, as all previous knowledge loses its specificity if need be, becoming a range of countless possible applications where before there was only a single execution. Not only is new knowledge appropriated, but old knowledge becomes new again.

The mention of the "formal" has proceeded thus far with no contextual definition of the word, and so at this point it should be clarified that for the purposes of this study, formal is taken simply to mean primarily concerned with form. Additionally, the term "tectonic" deserves further attention, both as a concept and so we may settle on an appropriate interpretation of the word for use in this study.

In his essay, "The Case for the Tectonic," Kenneth Frampton discusses this:

"There is a spiritual value residing in the particularities of a given joint, in the "thing-ness" of the constructed object, so much so that the generic joint becomes a point of ontological condensation rather than a mere connection," and on to say that, "it can be claimed that the poetics of construction arise, in part, out of the inflection and positionings of the tectonic object."

The mention of the spiritual value of a joint hints at the relevance of a fabrication based study - as it produces a body of knowledge that ultimately finds its manifestation in architecture, where we attempt to connect man not only with his environment, but ultimately, we hope, with himself. We can define here a more mechanical version of tectonic, as the ontological concerns Frampton mentions would be mostly project specific, where elements concerning man and his architectural interaction could be distilled as they related to the context at hand. Our focus is on building a more varied set of knowledge, through making,

3

of tectonic relationships. Henceforth for this study, tectonic shall be taken to be the transition between one material and another, or between different states of material, or a transferrance from one element of a tectonic object to another element in that same object.

Definitions of some specificity are required even in a discussion about a non-linear design process. We may move in unknown directions with known values, or with unknown values in a known directions, but not generally in unknown directions with unknown values. These passages concern our navigation through *designing*, not our overall outlook about the entirety of a project. A creative process can easily have localized limits or controls, even as the ultimate end is still unclear - we must learn to take comfort in these "local orders," concerning ourselves not with the finishing, but only with the immediate. A standard frame of reference from which to discuss is vital, lest we become disoriented and ultimately unable to discover. As we have defined formal, and also tectonic, we must proceed now to a more complex definition, of which these earlier references are merely components.
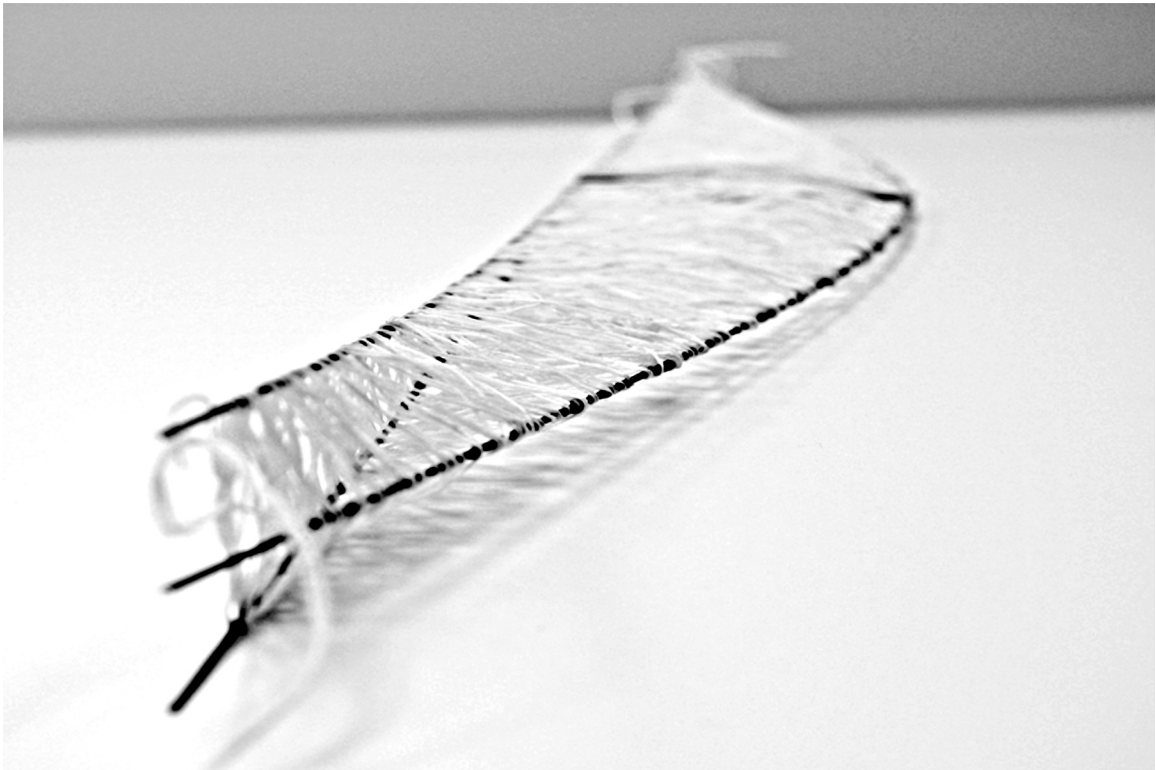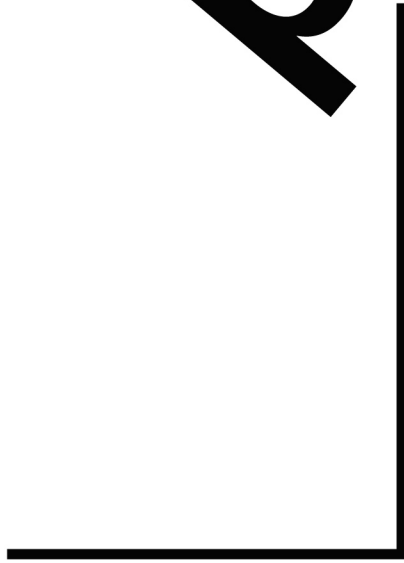
Fig. 2.   study model

4

play

Fig. 3.   play

5

Edourne Scott, in an article for the online magazine Suite 101, explains how we began to use the word "play" in the english language:

"The origin of the word "play" is unknown – all that is known is that English adopted the word pleien meaning to "dance, leap for joy, and rejoice" from Dutch in the later Middle Ages (c. 14th century). This was adopted into English as pleg(i)an, "to exercise, or frolic"... The verb to "play" was also adopted into the English language to mean exercise – by late Middle English this was defined as meaning to, "carry out or practise (an action), or perform or execute (a movement)". This meaning can be witnessed in the use of weaponry, swordplay, performing sports, play billiards, using instruments, played romantic ballads, and other games such as chess where one plays a piece, or cards where one plays a hand... From the late Middle English definition of "play", a series of actions could be described by the word – one could stake or wager in a game from the late 17th century, operate artillery fire from the late 18th century, emit a jet of water from the middle of the 19th century, "played the orange-trees", masturbate from the early 20th century, "play with oneself", as well as use a radio, "play the radio", and then describe the process of using a disc or tape from the middle of the 20th century, "play a record"."

Merriam - Webster online offers many versions- this the most relevant:

4 a (1) : an act, way, or manner of proceeding : maneuver <that was a play to get your fingerprints — Erle Stanley Gardner> (2) : deal, venture b (1) : the state of being active, operative, or relevant <other motives surely come into play — M. R. Cohen> <several issues are at play> (2) : brisk, fitful, or light movement <the gem presented a dazzling play of colors> (3) : free or unimpeded motion (as of a part of a machine); also : the length or measure of such motion (4) : scope or opportunity for action

A manner of proceeding, state of being active, operative, or relevant, free or unimpeded motion. This can begin to explain our non-linear process of play, but we must continue to explore the word, as it is understood today by those who study it, and what prejudices may come with its use as a descriptor. The connotations of *play* and *toy* as they relate to adults are those of childishness, lack of serious intent, and absence of product - one who is playing is not producing, that a toy is a distracton, and play is not profitable or relevant.

Mary Ann Glynn's study of tasks cued as play or as work and the resultant effects on the processing of information sheds light on the *actual* results of the label play, giving us reason to believe its other than serious connotation can in fact be helpful. The label play allowed users to relate to the *means* of a task, and the label work only a focus on the *end* (Glynn, 1994). Further discussion in Glynn's article talks about play labeling in the workplace:

6

"Moreover, to the extent that curiosity and imagination are desirable on the job - for example, to provide release from the monotony of lower skilled jobs or to enhance the creativity and innovation in higher skilled jobs - labeling work as play might actually be quite functional. Moreover, a playful approach to work may enhance job attitudes and outcomes when job demands are at the extremes, that is, when tasks are either inherently boring or highly involving (Glynn...)."

Results of the study further illuminate the benefits of play:

"Results indicated that players and workers performed equally well on measures of task completion and performance. However, players tended to be more intrinsically motivated and concerned that their responses were of higher quality; more important, they produced solutions that were more organic and image laden. Therefore, play may encourage individual (and perhaps organizational) creativity and flexibility. **By uncoupling means from ends, play decreases the risks commonly associated with experimentation and, thus, may produce more variance with its circuitous, organic, and galumphing responses.** Conversely, by taking a more streamlined route, work may be a more efficient but also more ossified mode (Miller 1973) and may be potentially less functionally adaptive (Glynn...)."

In a process-driven design scenario, an ability to linger on elements of the means, or to experiment for an extended time period within the established "local orders," be they imposed by material constraints or tool limitations or other qualities can be likened to a process of play, or even encouraged by labelling as such. Later in the study, we can examine the qualities of a tectonic toy, and whether its allure as a plaything relates to its usefulness as a diagram.

In this case it is the experience of the designer|student. A discovery can spur many more discoveries, a mistake can present a path unforeseen. Interest can hide in a beverage container, only revealing itself after an accidental nudge in the wrong direction.
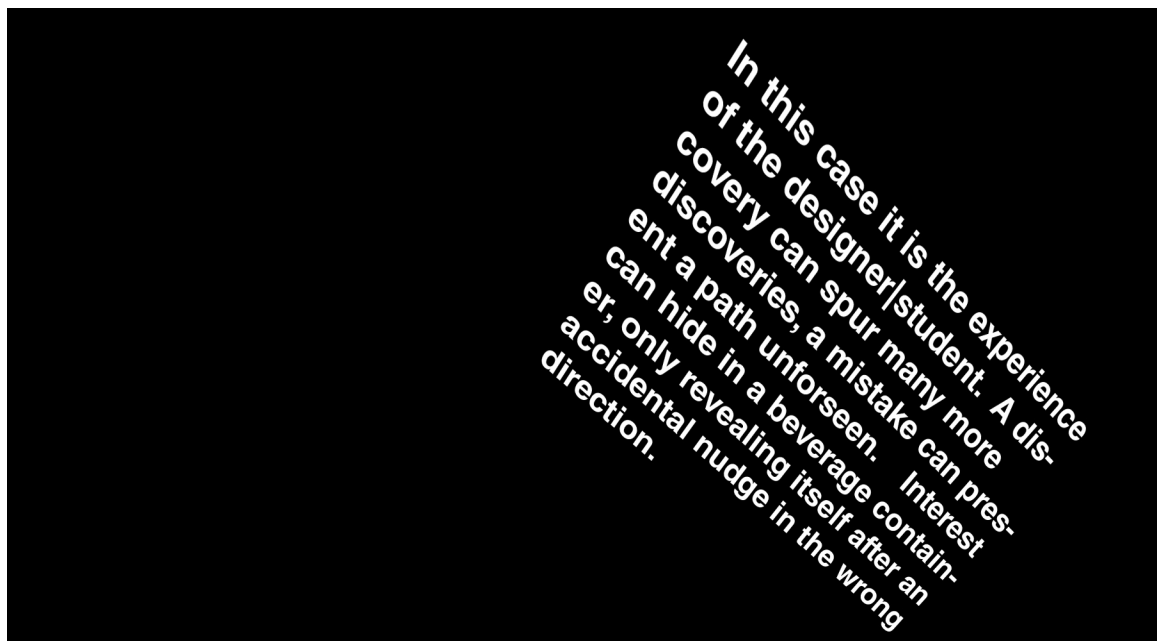
Fig. 4.   experience

For now, we can define local orders:

local orders-immediate limitations or frameworks from which to reflect and analyze, or physical contraints imposed on play by material or tool limitations or qualities

If the label "play" can cue the mind in such a way as to produce better results, then what are the elements of play and how can these elements assist us in our design processes? We must look first at motivation. Play has been shown to be associated with intrinsic motivation, that is, the performance of a task for its own sake, rather than as a pre-cursor to a desired output *from* the task, or extrinsic motivation. This correlates to our earlier discussion of these points:

Tangential investigations or intense study in any number of related subjects, engendering a knowledge base of differing and sometimes unrelated contents, melded with discoveries made during experimentation and alternate paths taken.

A varied, non-linear approach to the study of architecture and a knowledge base that can be scale-less, diagrammatic, and consistently useful, where all previous knowledge loses its specificity if need be, becoming a range of countless possible applications in place of a single execution. Not only is new knowledge appropriated, but old knowledge becomes new again.

These proposed methods are placed squarely in the realm of intrinsically motivated activities not because their practitioners enjoy them, although it is likely, but because they are not concerned with an end result - only with possible solutions and their interrelations. Stanford Anderson again as quoted by Negroponte, founder of the Architecture Machine, and ultimately of the Media Lab at MIT:

"...any problem-solving technique that relies on explicit problem definition, on distinct goal orientation, on data collection, or even on non-adaptive algorithms will distort the design process and the human purposes involved."

Clearly, these methods are vital to the practice of thoughtful, beneficial, creative design, and they are intrinsically driven - their motivation germinating somewhere inside the designer himself, this is important- they are deeply connected to the person. It is encouraging that activities of creation that ultimately benefit us may stem from something deep inside us, something that is already there- with no initial plan of "facilitating human purposes," only of doing what engages us, interests us, and makes us happy. In the next section we will explore the work of Mihaly Csikszentmihalyi and his discussion of Flow, creativity, and inrinsic motivation in the context of play.

Fig. 5.   flow

9

Our study of play as part of a creative design process will undoubtedly attempt to analyze or break down the components of this process. There may be an attempt to uncover the secret moment of "a-ha" from which an idea is born. This moment should be recognized as secondary, for as those in creative pursuits know, it is not a moment of genuis that produces good design, but a well honed exploratory process of acts and thoughts. The subordination of the creative flash is not intended to reduce its importance, only to position it properly, so that we may better understand its place among other design activities. In his book, Beyond Boredom and Anxiety, Experiencing Flow in Work and Play, Csikszentmihalyi qoutes Steiner on analytic thought:

"Analytic thought has in it a strange violence. To know anlytically is to reduce the object of knowledge, however complex, however vital it may be, to just this: an object."

Csikszentmihalyi continues, "To a certain extent, our attempt to formalize the experience of enjoyment and the activities that allow it to occur results in a relative impoverishment of the object of knowledge. However, as long as one remembers we are talking about a model and not the real thing, not much harm will be done (Csikszentmihalyi 1975, 11).

Models and diagrams are representations of some actuality. To be sure, I hope to begin approximating some reality about creative process in this thesis, and, since it will be experience-based rather than derived from pools of data, interviews, and standard deviations, it will lack some of the mathematical abstraction. Adding the connective tissue that bridges between model and real thing is not the goal, but perhaps approaching the process less as an object for dissection and more as an experience, and allowing for thoughts, pictures, and fabricated things to form the field of information as it holds true for me, we may come a bit closer to what drives all of us, as our myriad paths eventually converge at the designed thing. Again, with this comes new knowledge as well as the re-framing of old knowledge, our own personal knowledge - in each case unique -and relative to the ideas in this study.

Csikszentmihalyi discusses autotelic activities, or activities that "regardless of their formal differences... all give participants a sense of discovery, exploration, problem solution - in other words, a feeling of novelty and challenge" (Csikszentmihalyi 1975, 30). This description could easily apply to process experimentation relative to local orders. "The outcome of an autotelic activity is uncertain("like exploring a strange place"), but the actor [or player | designer] is capable of controlling it,"(Csikszentmihalyi 1975, 32). It is important to note that these ideas do not reflect the commonly held notion of play as a nebulous activity whose participants are irresponsible or frivolous (especially adults), but rather a more structured state of cause and effect:

Csikszentmihalyi:

"...the autotelic experience is one of complete involvement of the actor with his activity.

There is no time to get bored or to worry about what may or may not happen. A person in such a situation can make full use of whatever skills are required and receives clear feedback to his actions; hence, he belongs to a rational cause-and-effect system in which what he does has realistic and predictable consequences. From here on, we shall refer to this peculiar dynamic state - the holistic sensation that people feel when they act with total involvement - as *flow*. In the flow state, action follows upon action according to an internal logic that seems to need no concious intervention by the actor... and in which there is little distinction between past, present, and future... and play is the flow experience *par excellence"* (Csikszentmihalyi 1975, 36-7).

Earlier we defined formal and tectonic, and alluded to a more complex definition, of which the previous references were merely components. At this time, having reviewed details about the word, briefly visiting information about its psychological implications and the types of experiences associated with it, we can proceed to define *play*, as it applies to this study:

play (in design) - the enjoyable, sometimes spontaneous execution of investigations or maneuvers relative to material, tool, or geometric constraints, for the sake of investigation itself; responses to discoveries elicit further investigations or changes in course based on their results as they pertain to formal, tectonic, or spatial considerations unique to the designer or project

anticipation

Fig. 6.   anticipation

A design process is a special type of play. Csikzsentmihalyi comments on the difficulty of maintaining flow for a long time without some interruption (Csikszentmihalyi 1975, 38). In design, our processes may be shelved for some time before we can return, much like a puzzle left on a table in a spare room, saved for a later attempt. This in-between time is not really time off. It may not necessarily be a flow experience as hand building or drawing or computing might be, but it is a vital component of the process, even as it is physically more passive.

This time spent on other things is also spent designing. This may occur literally, as thoughts about a project or experiment that come while driving - as driving is almost completely right brained, non - analytical; or while attempting to fall asleep or enjoy a meal, the design thoughts may not relinquish their grip on the player simply because he has let go of the toy.

There are also less literal ways in which we design. These may not be relevant immediately to the project at hand, but when re-considered or remembered in a new light, could provide a spark or emergent solution to a design problem. These could come from anywhere, a condition which produces a certain sound, a device, a building or memory. The instances of this satellite input should increase as our design skills become more versatile. Always we are seeing as designers, we do not turn this off, and the better we see, the more we see. This type of mental play is somewhat analytical, somewhat emotional. For instance, one may decide what it is that makes a given chair desireable or undesireable when shopping for furniture. This is a personal activity, ultimately subjective, but from first glance to tenth thought, analysis occurs.

As a possible solution comes to us outside the studio, another facet of the process emerges, that of anticipation. The aforementioned design - thinking can be very fruitful at inconvenient times. This begins another cycle, where out - of - studio thoughts become directed at the newly realized possible solution. This can trouble our sleep and ruin our conversational skills. We may forge twenty-five new solutions in our minds based just on that recent mental discovery. This could begin to approximate the "a-ha" moment and its aftermath. In this state we may take notes in a journal to ensure an accurate memory of the idea, or pehaps the more aggressive designers among us may return promptly to the studio - immediately testing the next step's suitability.

This anticipation has, to me, shared many flow qualities with active making, in that I am unaware of myself and operating at the extent of my skills, but still capable of some success, especially since nothing has actually happened yet. Csikszentmihalyi suggests that a lost state of flow can be re-gained by either decreasing challenges or increasing one's skills, depending whether someone is experiencing boredom or anxiety (Csikszentmihalyi 1975, 52). In this situation, the only activity involved is thinking, but since a solution has presented itself in some way, via external input or just plain cognitive rigor, the challenge has decreased slightly, anxiety has dissipated, and a quasi - flow state has returned. Until the idea is physically tested, we are in a state of perpetual victory.

A design process is a situational microcosm, assuring us that if our practices are as honest and fraught with difficulty and joy as our lives are, then we are proceeding somehow very naturally.
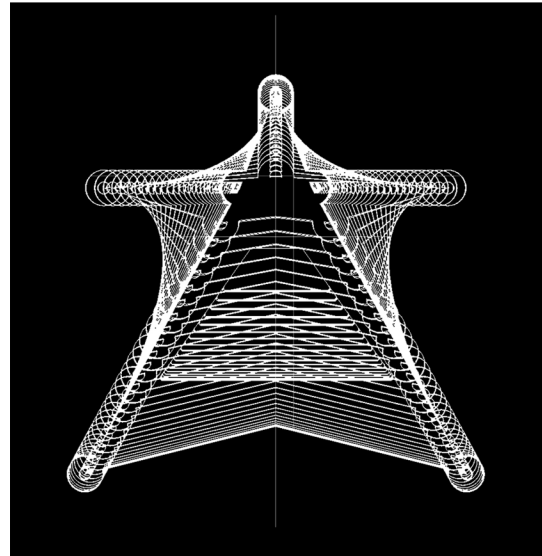

Fig. 7.   many pieces

Fig. 8.   craft

"... the work process has to do something distasteful to the tidy mind, which is to dwell temporarily in mess - wrong moves, false starts, dead ends. Indeed, in technology, as in art, the probing craftsman does more than encounter mess; he or she creates it as a means of understanding working procedures," (Sennet 2008, 161).

Our discussion of local orders and their existence relative to material and tool interfaces inevitably leads to a discussion of craft. We can reference Richard Sennett's 2008 book, The Craftsman, for illumination in this area. Sennet discusses the type-form, which he describes as "technology-speak for a generic category of object: change occurs through the elaboration of its species. Once the ancient technology of slips was worked out, [in ceramics] for instance, pots could be produced with red *or* black backgrounds. Each type-form can beget complicated species," (Sennett 2008, 125). The type-form in this case is a pot, that is the generic object that, through elaboration, leads to many different pots. Here, the local orders would be clay consistency and availability, knowledge of the ceramicist, kiln temperatures, etc. Through play within the local orders, but not necesarily in the direction of a specific pot, one would begin to discover qualities about the process or object that could lead to improvement or modification, or, in Sennett's words, metamorphosis. Sennett's discussion privileges discoveries made while engaged in a specific craft, this thesis seeks to elucidate similar discoveries in play, where no specific craft is involved, save perhaps the craft of design, in itself a multi-disciplinary pursuit. For instance in our case, we might explore how clay could be made to conduct cellular signals, this has no apparent use, but is beyond the scope of the crafts generally associated with these two areas, and could lead to strange and important discoveries. This is where creative pusuits excel, and where play is most vital.

Sennett's research does more to support this study. We must again visit our earlier idea that *a varied, non-linear approach to the study of architecture produces a knowledge base that can be scale-less, diagrammatic, and consistently useful, where all previous knowledge loses its specificity if need be, becoming a range of countless possible applications in place of a single execution. Not only is new knowledge appropriated, but old knowledge becomes new again.* This corresponds to Sennett's discussion of a *domain shift*:

"Perhaps the metamorphosis that most challenges the maker conciously to maintain form is the 'domain shift.' This phrase -my coinage - refers to how a tool initially used for one purpose can be applied to another task, or how the principle guiding one practice can be applied to quite another activity... weaving, the craft first celebrated in the hymn to Hephaestus... this was a craft that traveled across domains... The cloth join of warp and woof shifted domains to the mortise-and-tenon joint of shipbuilding... both weaver and carpenter concentrate on making tight right-angle joints... This metamorphosis proceeded into a further domain, as the locked orthogonal joints of both cloth and wood suggested a way to lay out streets... The image of an 'urban fabric' was not here a casual metaphor,

rather a direct description," (Sennett 2008, 127-8).

Here, the "domain shift" Sennett coins may have occurred over years of cultural development and happenstance overlap, but suppose the entire goal had been to pluck the ninety-degree angle from weaving as a basic diagram of how two things might fit together. This is now immediately applicable in many realms. Having seen the overlap in history, we can now look for it in design play, no longer waiting for time or happenstance to reveal it.

Initially in our discussion of craft, we positioned design as an integrator of multiple crafts, able to transcend individual fields of knowledge in the interest of experimentation. We imagined a designer asking a question about whether ceramic could, as an insulator, conduct cellular signals. This an absurdity a ceramicist or electronics technician might not consider. Still, design *is* a craft, a craft that invites the integration of multiple other crafts. Though the craft of design may be a many faceted pursuit, it can be viewed the same way Sennett views other, more specific crafts.

In a play-driven design process, the idea of the mistake shifts from its traditional space of undesireable error into a new space of discovery. Ideally, the designer operates from a standpoint of openness, rendering error an impossible concern. In most cases, the error or inadequacy will stem from a failure to operate within a local order, or from early attempts to expand the order or perform a "domain shift." These glitches educate the designer about the qualities of the order and/or the designer's personal strengths and weaknesses, rarely known in their entirety at the outset. Sennett observes:

"...the intimate connection between problem solving and problem finding. A "flamboyant" worker, exuberant and excited, is willing to risk losing control over his or her work: machines break down when they lose control, whereas people make discoveries, stumble on happy accidents," (Sennett 2008, 113).

Here we should remember our previous discussion of Csikszentmihalyi's flow, and that in order to retain a state of lost flow, one must either increase one's skill level (or perhaps broaden one's skill set, where design is concerned) or decrease the challenge (Csikszentmihalyi 1975, 52). What about the non-flow states *during the work*? Is there more to this process than constantly maintaining flow? The excitement-induced loss of control Sennett mentions is comparable to, if not indicative of a flow state. But what of the glitches and errors that seem temporarily insurmountable? Surely they are necessary, and frequently they will interrupt a flow state, so how does a designer begin to manage an open perspective, one that embraces these mistakes? Sennett suggests, "the patience of a craftsman can be defined as: **the temporary suspension of the desire for closure,**" (Sennett 2008, 221).

Earlier, I quoted Sennett regarding the creation of a mess in order to better understand working procedures. In design play, especially when navigating through an exploration of material studies or tectonic relationships, we may ask three-dimensional questions of the material or relationship. This method of inquiry can be categorized as play. An attempt to

17

play at the outer edges of a local order's boundary will produce one of two results:

The first possible result is the discovery of different boundaries than originally supposed. There may be greater flexibility to the system than the designer anticipated. This is not a single push and a resultant discovery, but more of a constant give-and-take activity.

The second possible result is the glitch. The boundary has been reached. The material is incapable of the demands the designer has imposed, or the action taken is outside the designer's skill set, unable to be executed with predictable results.

In each case, learning takes place. These instances do not comprise the whole of design play, as frequently play can occur well within the known bounds of a local order, in effort to dabble in variety. However in a flow situation, a designer is just ahead of the limits he or she seeks to establish. When a glitch is encountered, a limit is established, and a decision must be made about how to proceed. **The more of these decisions a designer makes, the more the designer's skill set expands.** It is therefore desireable to drive the flow state into these halting edges. "Resistances then, can either be found or made. Both cases require toleration of frustration, and both require imagination. In found difficulties, to cope we will identify with the obstacle, seeing the problem, as it were, from the problem's point of view. Made difficulties embody the suspicion that matters might be or should be more complex than they seem; to investigate, we can make them even more difficult, (Sennett 2008, 226).

The following page will approximate these relationships in a digram. The graphic represents the cyclical naure of a design procees, it should be noted that the interval between stages will vary, and that some will never exit the order; it may be unecessary based on the indiviual project stipulations. This sudy is conducted largely in the realm of making, therefore notions of thickness and tolerances inevitably test the designers skills and the constraints imposed by tools and materials. It is also important to re-iterate the premise of the study, that an intrinsically motivated, non-result-seeking process serves to generate a set of tools that enables rigor in each instance of design.
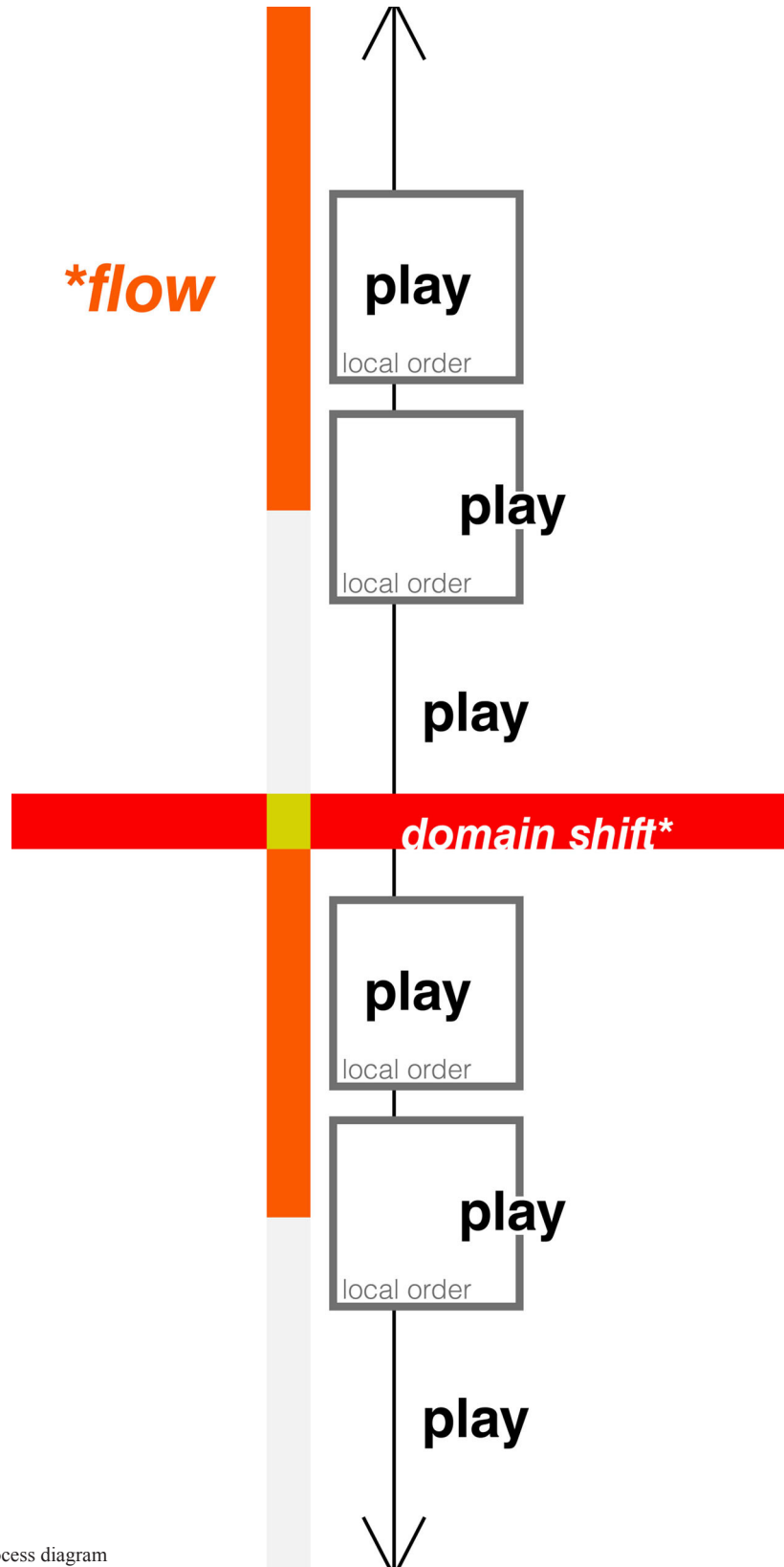
flow

play

local order

play

local order

play

domain shift*

play

local order

play

local order

play

Fig. 9.   play process diagram

19

ontological concerns

Fig. 10.   ontology

Earlier I observed:

Models and diagrams are representations of some actuality. To be sure, I hope to begin approximating some reality about creative process in this thesis, and, since it will be experience-based rather than derived from pools of data, interviews, and standard deviations, it will lack some of the mathematical abstraction. Adding the connective tissue that bridges between model and real thing is not the goal, but perhaps approaching the process less as an object for dissection and more as an experience, and allowing for thoughts, pictures, and fabricated things to form the field of information as it holds true for me, we may come a bit closer to what drives all of us, as our myriad paths eventually converge at the designed thing.

So far, we have taken elements of play, craft, and flow and determined their interactive nature relative to local orders. We have not dissected, but we have reduced - that is, trimmed the fat to a point of universal genericism. The diagram produced behaves very much like the other diagrams discussed, a range of countless possible applications where before there was only a single execution. Moving forward we can begin to build the field of infromation; thoughts, pictures, and fabricated things. Here the ideas become *project specific*. These relate directly to the experience of this thesis, and where the diagram shows the organization of elements within a process, this collection of data can begin to approximate the reality of design as it pertains to feeling and making. Again, we will

not be able to, nor is it our goal to, completely bridge the gap between model and actual. Adding this layer to the study may help to bring us closer to the place where we converge as individuals. By augmenting the organized abstraction with one person's experience in all its randomness, messiness, and moments of success or failure, we include an important component, empathy.

In the beginning I set out to make a toy, or rather, to use a toy as a vehicle for design exploration. There was to be a series of toys, and there was an initial diagram that would guide the process (next page). This diagram has not proved useful, as it is not generic enough to allow a variance in creative process to occur, however it is also a part of the process and should not be ignored. I will breifly discuss each toy made in this part of the study with one or two images, the rest of the process images may be found in bulk at the back of the document.

It is noteworthy that the idea of making a toy at the outset of each object's creation was needlessly restrictive, as though I had somehow ignored ideas about pre-conceived notions truncating the process. This notion took a great deal of work within the "toy" mindset to eventually come to light. What seemed initially liberating (What could be less restricive than a toy?) only appeared so because I did not yet have a clear diagram. My notions that a toy was any different than architecture were mistaken, viewed in the light of a true process diagram, with its mapping of flow, local orders, and possible domain shifts.

A student of mine received a degree in mathematics prior to attending architecture school. She commented that the 'play process diagram' was remarkably similar to the steps she used to take when writing a mathematical proof, or attempting to solve complex equations. This intrigued me, because I also have a degree in mathematics, albeit a lesser degree than she- and the question then remained, is the diagram truly generic? Developed for design processes, yet applicable to mathematics, in many cases a far less nebulous undertaking, was the diagram actually shifting process domains- or was it inherently applicable in math because some portion of my own thinking has been shaped by math in the past? This type of discussion illuminates for me the naivete in my presumtion that a toy was a freer object than any other, and may remind us once again that old skills can begin to find new life. Perhaps the diagram is useful anywhere outside of design, or perhaps only in math, as I could not erase any of my own mathematical tendencies in authoring the graphic as it came to light in my own process.

The diagram, images, and information that follow are the initial portions of this study, where making began to inform process, and the nature of what a play-based process is could begin to emerge. I began the study with false clarity, but through analysis and careful consideration was able to understand where I had been, and therefore where the study might go. These objects do not carry with them any of the previous chapters' illumination in its entirety, as they are the vehicles by which, step by step, I was able to arrive at my current positions.
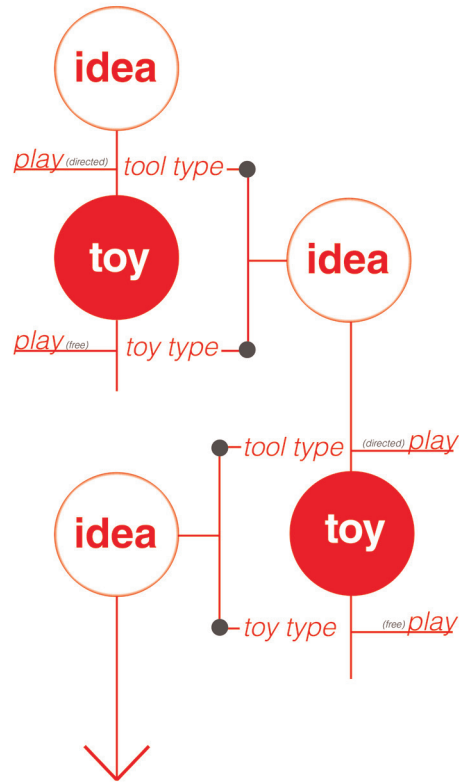
Fig. 11.   Initial process diagram, too rigid

Fig. 12.   early studies

Toy one was an exploration of a ninety degree turn, a slotted square biscuit, and ordered assembly. The chapter title shows a digital example of this relationship. Building with this toy involved a constant rotation of the biscuit along an axis in order to construct components of adequate size for spatial situations to occur. Concurrently along the axis of rotation, orthogonal planes would form, this served to interrupt space that occured in both perpendicular axes. Any additional pieces would then begin to close off small portions of space, creating static situations and rendering varied spatial formation difficult. An assembly of these pieces at a living-room-wall scale could prove interesting and might allow for pleasing situations where light is concerned, but the toy was ultimately too limited for fluid play.

The toy was laser cut from 1/8" masonite. The slots were 1/8" wide, with zero tolerance allowed, save for any material consumed in burning by the laser. Some pieces were difficult to interlock, and some went together loosely. The consistency in slot size highlighted the inconsistent material thickness. The toy was drawn in the computer first, then fabricated.

Some months into the study, I discovered that this idea was certainly not original, there were several toys on the market that were very similar, although differently proportioned. This raised the question, what if I had studied this toy as a precedent? Would I have given thought to material thickness and sizing in the same way as I had when designing it myself? Would the lessons learned from studying a precedent last as long as those learned in designing the object? Could I consider them additives to my skill set, or would they serve merely as observational data for consideration right now, with no future benefit? Would this depend on the method of study, or would design lessons always resonate longer than research lessons?

Answering these questions could take years of research, but as part of a process, they raise awareness about how we might learn more, and more effectively, when designing. I can now begin a process with books and precedents on hand, but not feel burdened by a requirement to pour over them for hours with tracing paper and colored pencils, knowing that my own mistakes and discoveries will be invaluable, and that the examples are there if needed.
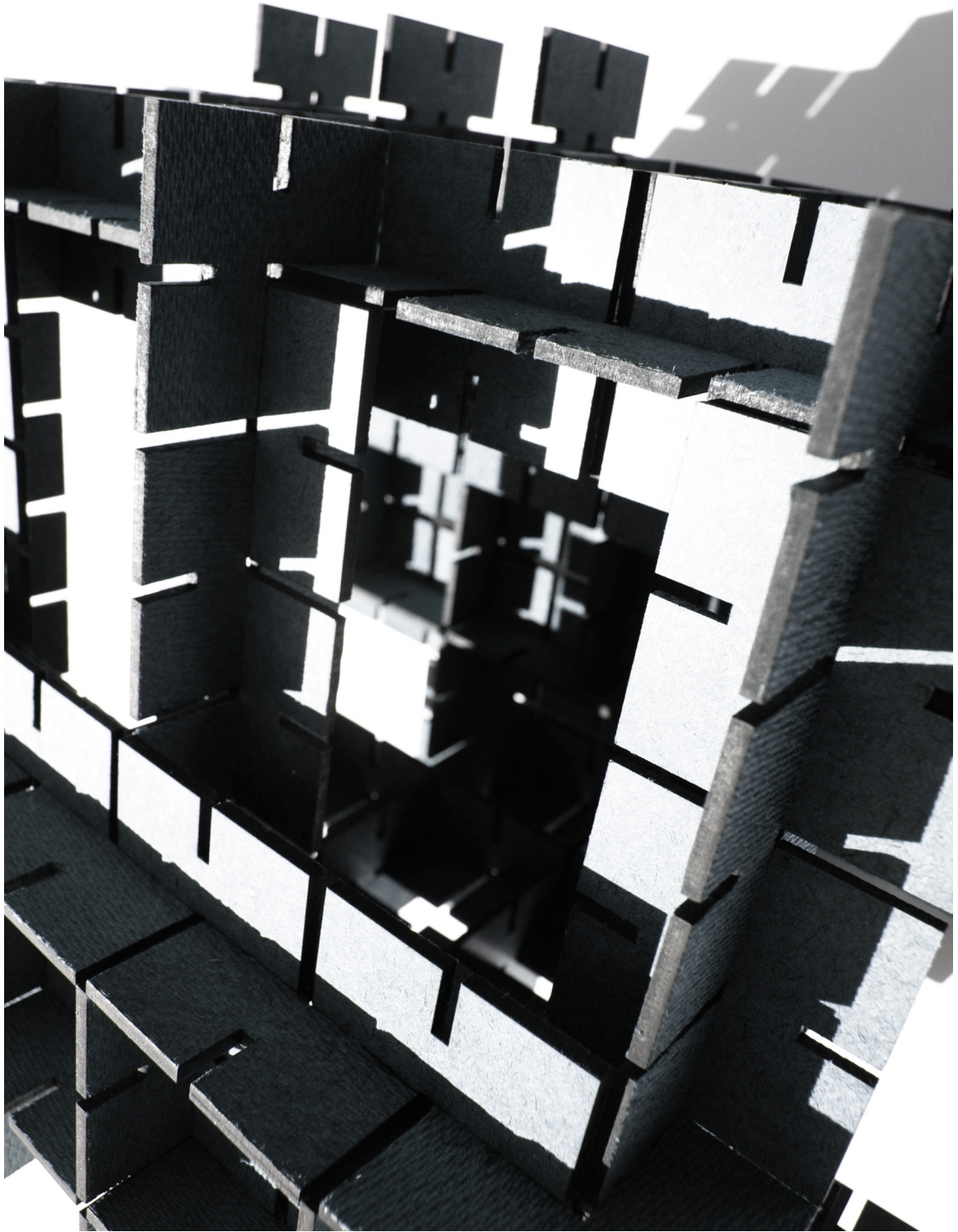
Fig. 13.   toy 1

Fig. 14.   toy 2

Toy two was a variation on toy one. The slots were adapted for easier slotting, with widened openings at the edge of the square. Added were forty-five degree angle slots in the corners, as well as connector pieces. The connectors were slim flats that served to connect two squares in the same plane without the resultant othogonal planar condition. Connectors were dimensioned not only to join two pieces at the ninety degree slots, but also across forty-five degree slots, some were the lenght of the square's side, some the length of it's hypoteneuse.

Toy two's biscuit pieces were cut again from masonite, and connectors from 1/8" plywood. The plywood and masonite were rarely the same thickness, and pieces were loose when joined. This toy was not sturdy enough.

After toy two, still following the initial protocol, I chose to move into a non-digitally derived method of design. I was disenchanted with the limtations of the mathematically conceived biscuits. An object with such exact interlocks makes it difficult to break into new territory, and I felt that these toys were not generative enough to begin enriching the process. Additionally, I had become bored with the method of fabrication and desired a more visceral interface.

This shift in tool use was also a shift in mindset, away from a strict notion of the tectonic as connector or joint, and into a fuzzier area of proximity between pieces, and conglomerate surface quality. Color was introduced, and the fabrication was driven by an attempt to perform a manipulation known as coving, followed by angle cuts and jigs, almost all performed with a table saw. Coving involves passing a material across the saw blade not in the parallel direction, as usual, but at an angle. The blade is raised slightly after each pass, removing only a small portion of material each time, eventually leaving a parabolic void whose narrowness is determined by the angle at which the material intersected the blade. This process requires the maker to build a set of tracks across the table for the material to slide between, keeping its path across the blade consistent with each pass.

Toy three was essentially a shish-kabob of oddly shaped, laterally symmetric blocks with a hole in the middle for sliding onto a dowel. The figure shows the general shape of the piece, an arched portion removed by coving, other angled cuts with a jig. Painting one side of each piece added directionality to play, and allowed the apparent formation of semi-undulating stacked surfaces. The arc was challenging to cut, but didn't allow for enough interlocking to retain interest. Another rough version was fabricated with no color and a simpler shape, these pieces were more engaging to play with and allowed for a greater number of configurations.

This was a very quick stage in the toy portion of this study, more theraputic than analytical. Considering pencil marks on the material and their implications about the block of wood's formal future, working in contented repetition- shop sounds muffled by earplugs, sanding, oiling, painting. Placated by the smell of sawdust, I was in a space of indulgence- and feeling a bit hedonistic about my lighthearted woodshop escapades. The toys seemed to reflect this, their appearance was much more like something we might recognize as a childs toy than toys one and two. They were more payful *looking*.

27

Fig. 15.   toy 3 A

Fig. 16.   toy 3 B

Fig. 17.   toy 3 C

Looking back, it seems that the shift of mind that took me from the interlocking biscuits to the toppling kebabs was preparatory. As I found myself enjoying the practices of hand tools and finishings, my mind would wander more easily between ideas. I missed making architectural study models, small promises of future gestures- embryonic knotwork that might give way to elegant perchings of mass upon mass. The toys were blocky to me, unrefined and unoriginal. I already knew how to use the table saw.

As I was driving up to school to do some shop work on these toys, I began to consider a toy that might allow play with the force of tension. I designed toy four almost entirely in my head while working on toy three.

Toy four approached play in a much different way than the previous toys. Where the first toys allowed any player to make space and build, the fourth toy engaged the sensibilities of a designer. This more abstract plaything consisted of a perforated board strung with elastic, through which dowels could be inserted and the elastic tensioned on their ends, on both sides. There was no explicit containment generated by this play, it was merely suggestive of relationships, like a diagram or graph. There was somehow a quiet pleasure in stretching the strings and choosing which dowel might be put through the board, and then in assessing and adjusting, for whatever reasons.

It was simple enough to line up the holes on a grid and drill through the poplar board, however adjustments were made for some tear-out on the underside of the piece. Each dowel was given two grooves in each end to accomodate the strings, but the second groove proved unnecessary. One afternoon a few friends and I were wasting time in the empty shell that would soon be our digital fabrication lab, so I ran and got the toy. As we passed it around, I noticed that each person treated the object very differently. Most importantly, some would attempt to break it or force it into uncomfortable configurations which I had not predicted.

These renegades opened a new door, the toy was painfuly two dimensional, and as I realized the nature of its limitations, I immediately started designing toy five, the perforated board becoming a perforated stick, a toy that could engage the stretching lines and dowels on all four sides. Simultaneously I realized a greater value in collaboration than I had previously given credit for. Always we would stand around the desk tinkering with these things, but rarely did anyone push the toy outside of its local orders as this one had been. This would lay mental groundwork for the next portion of the study, a project to be given to students as a precursor to their studio design project. That in turn would somehow fast forward the research, ultimately exposing the strengths and weaknesses of designing a toy as a vehicle for process study, and allow for an important evolutionary model to develop, in addition to the play process diagram.
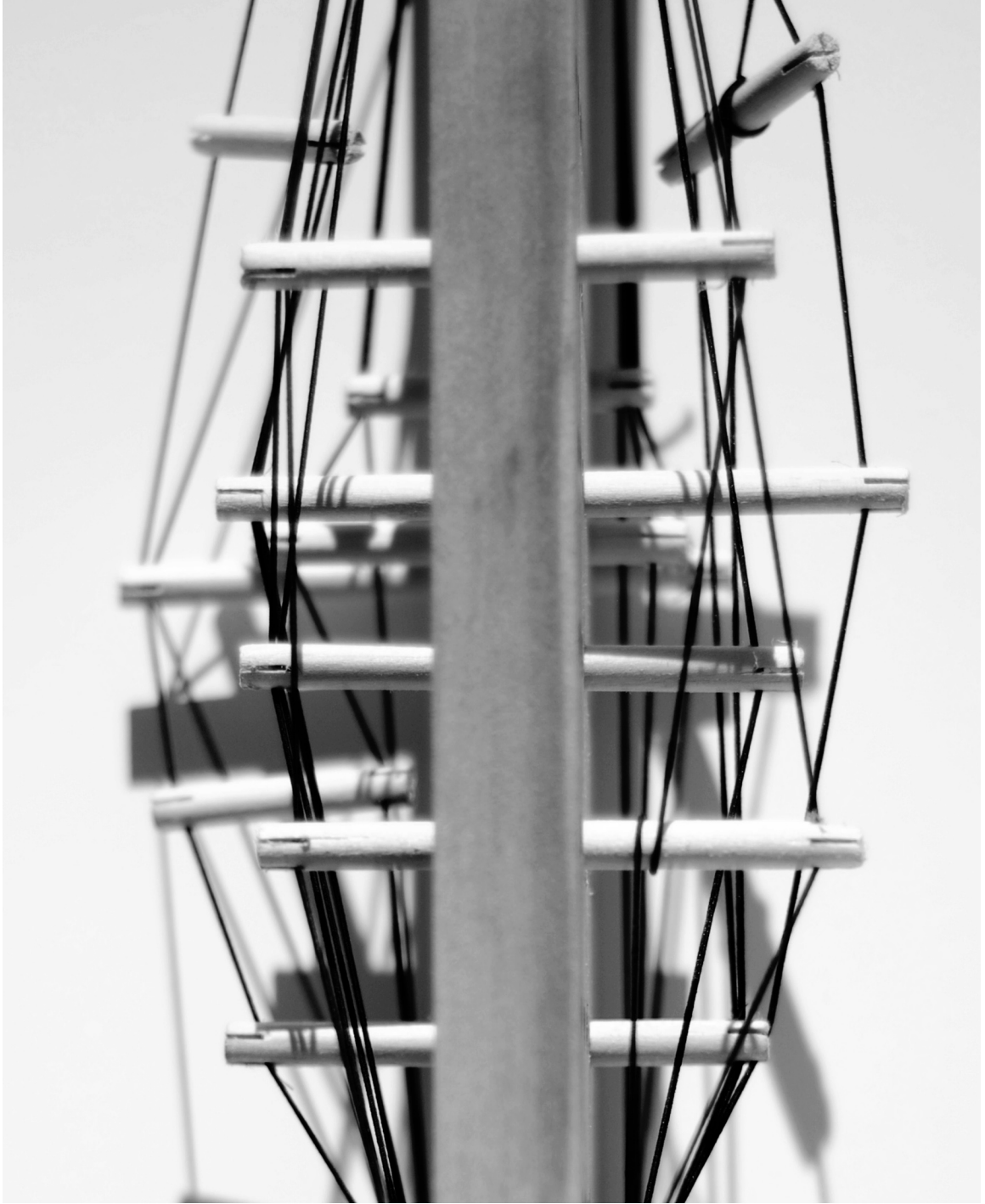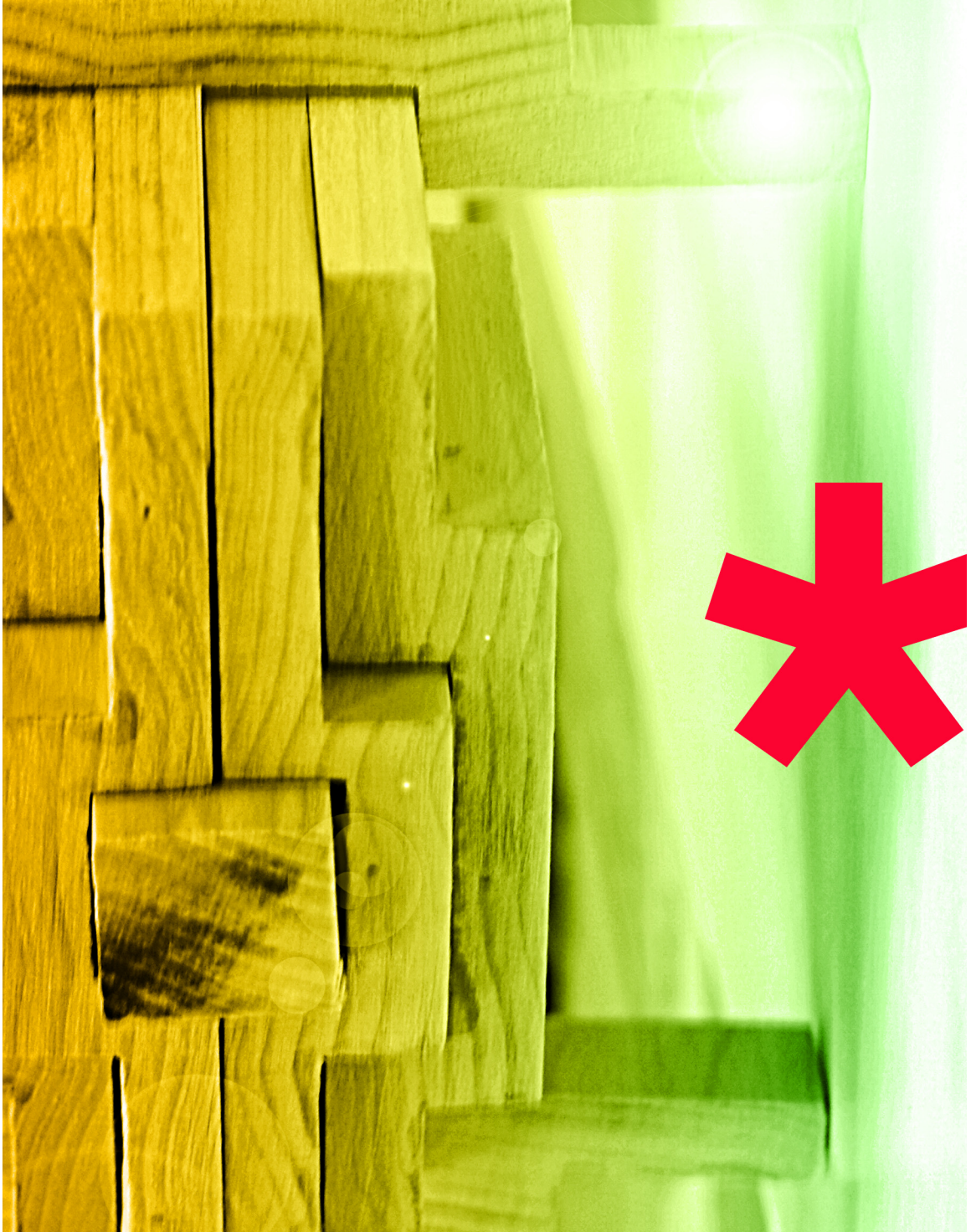
Fig. 18.   toy 4

Fig. 19.   toy 5

Fig. 20.   mark's class

A professor approached me with a proposition. He needed to travel out of town to give a lecture and wondered if I might take his design studio for the week. I would give them an assignment that served as the initial construct for their upcoming design project. He wanted them to make tectonic toys that could ultimately inform their structural strategies.

This seemed to me a fantastic idea, as most of the students I had worked with already in their first year studios. We had a friendly rapport, and the group was more talented than most. The assignment was about a week and a half long, there were to be two iterations of the toy. The first one was exchanged for another students toy, and the second an improvement based on that students suggestions.

The exercise has been difficult to assess relative to this study as it stands. Due to the sheer variety of ideas and number of projects, any attempt to catalog or analyze the projects results and processes would undoubtedly curtail my own productivity.

I felt that the students were somewhat restricted by the necessity of making an actual toy, rather than a hypothetical model of some hopeful possibility. There were indeed benefits to their study in actual size, feel, and function, but in some ways it bolstered my belief in the importance of speculative production. Sometimes I feel relieved to have escaped that tawdry affair with reality.

Still, the realm of the real is where architecture exists, and the evaluation of an objects *actuality* versus its *possible effectiveness* is a necessary tool for honing one's process. The students experienced some tension attempting produce real objects versus models, there were obstacles not normally encountered in the land of glue and cardboard. Additionally, it seemed as though the female students were off to a better start than the males. The males wanted to innovate immediately, seemingly ignorant of the benefits of diligent re-working of a mundane idea until, eventually, it liberates itself before you and becomes extraordinary. This moment seems immediately obvious, however it would remain undiscovered without all that came before. Female students seemed content to see what might be hiding behind seemingly simple beginnings.

After my week with these students, there were countless new ways in which to return to this study- and the nature of knowledge gained lies somewhere between that temporal tutelage of the case study and the lifelong boost in skill of firsthand design. Although I was not designing, I was interacting with the students, listening, playing, laughing, and making suggestions or becoming excited alongside them when discoveries were made. Critique has long been the cornerstone of design education, but a place somewhere between professor and peer, neither juror nor presenter, allows a truly generous opportunity for growth. I found that, like the first shift away from laser cut math-toys, and the second shift into stretchy-stringboard playspace, another shift was occuring. The necessary steps I needed to take were somehow not necessary at all. Nothing was really necessary, other than curiosity, a set of rules, and a lack of fear about what might come of it.

The images that follow are from toys made by the students of Prof. Mark Weston's Design 3 studio. They were as much a pleasure and an inspiration to work with this year as they were in their first year.
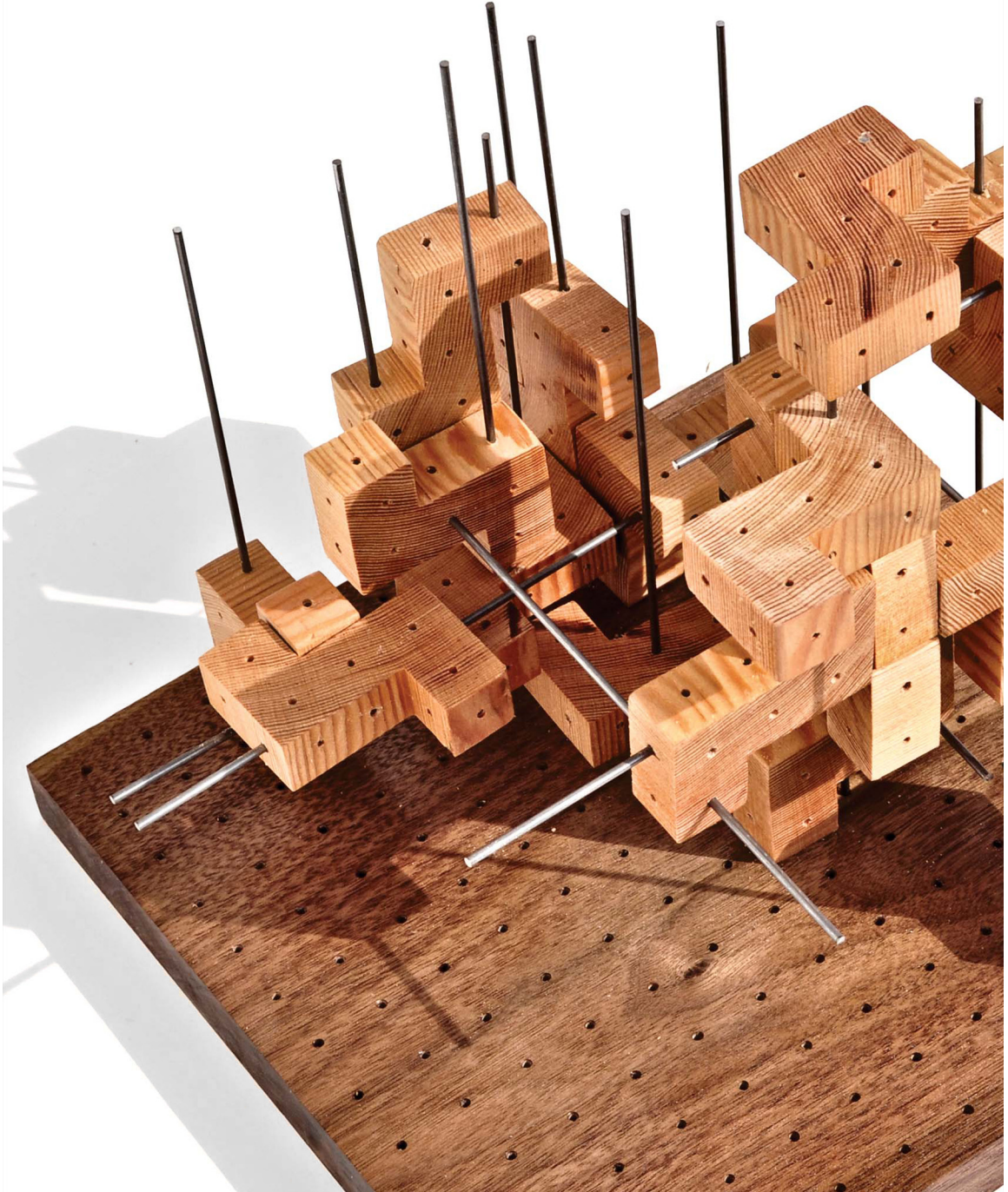
ashley

Fig. 21.   Ashley Garrett

daniel

Fig. 22.   Daniel Johnson

37

darci

Fig. 23.   Darci Chamberlain

38

Fig. 24.   Derek Pirozzi

Fig. 25.   Emily Resciniti

josé

Fig. 26.   Jose Gomez
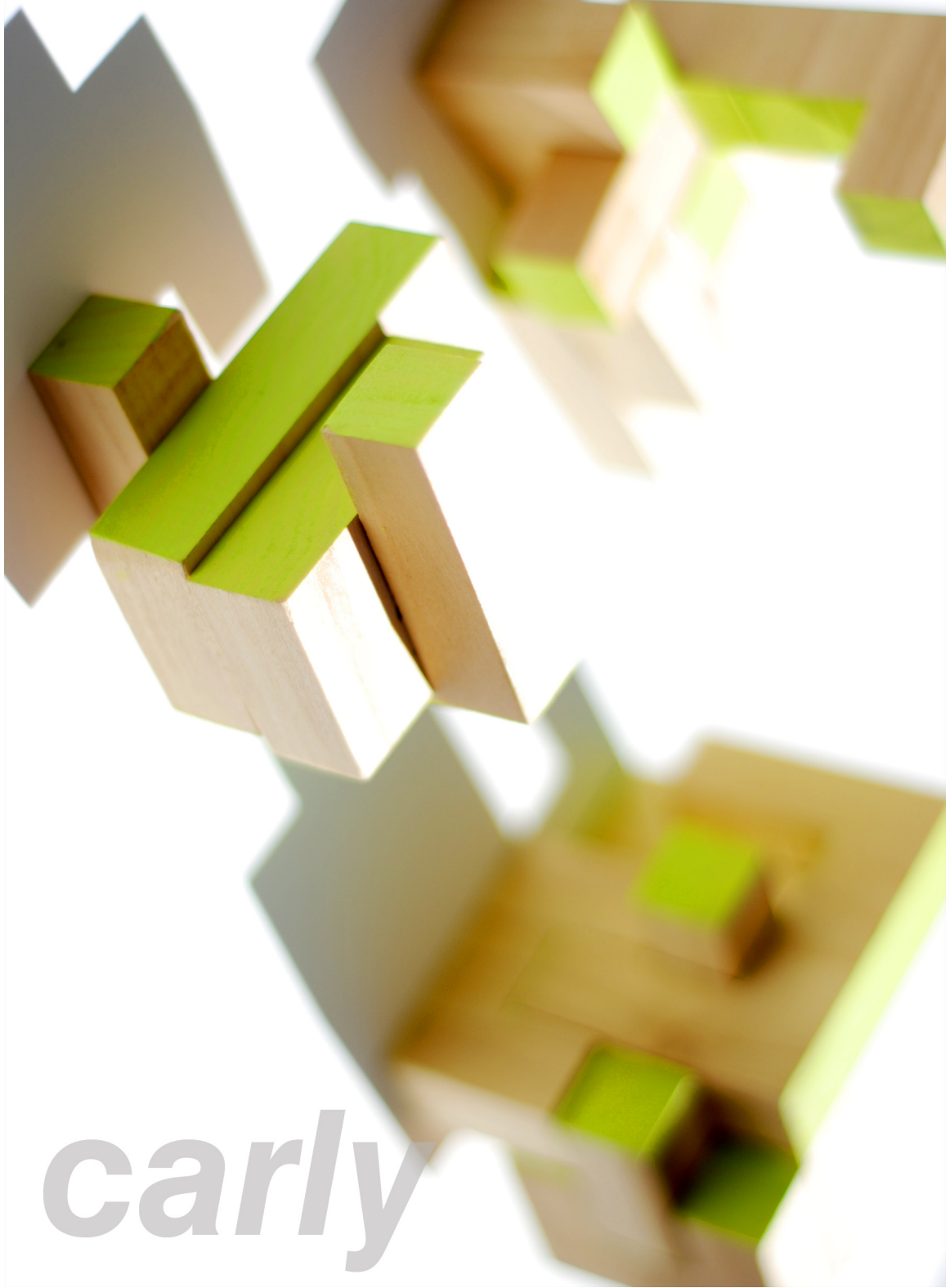
Fig. 27.   Justin Warner

Fig. 28.   Carly Wooten
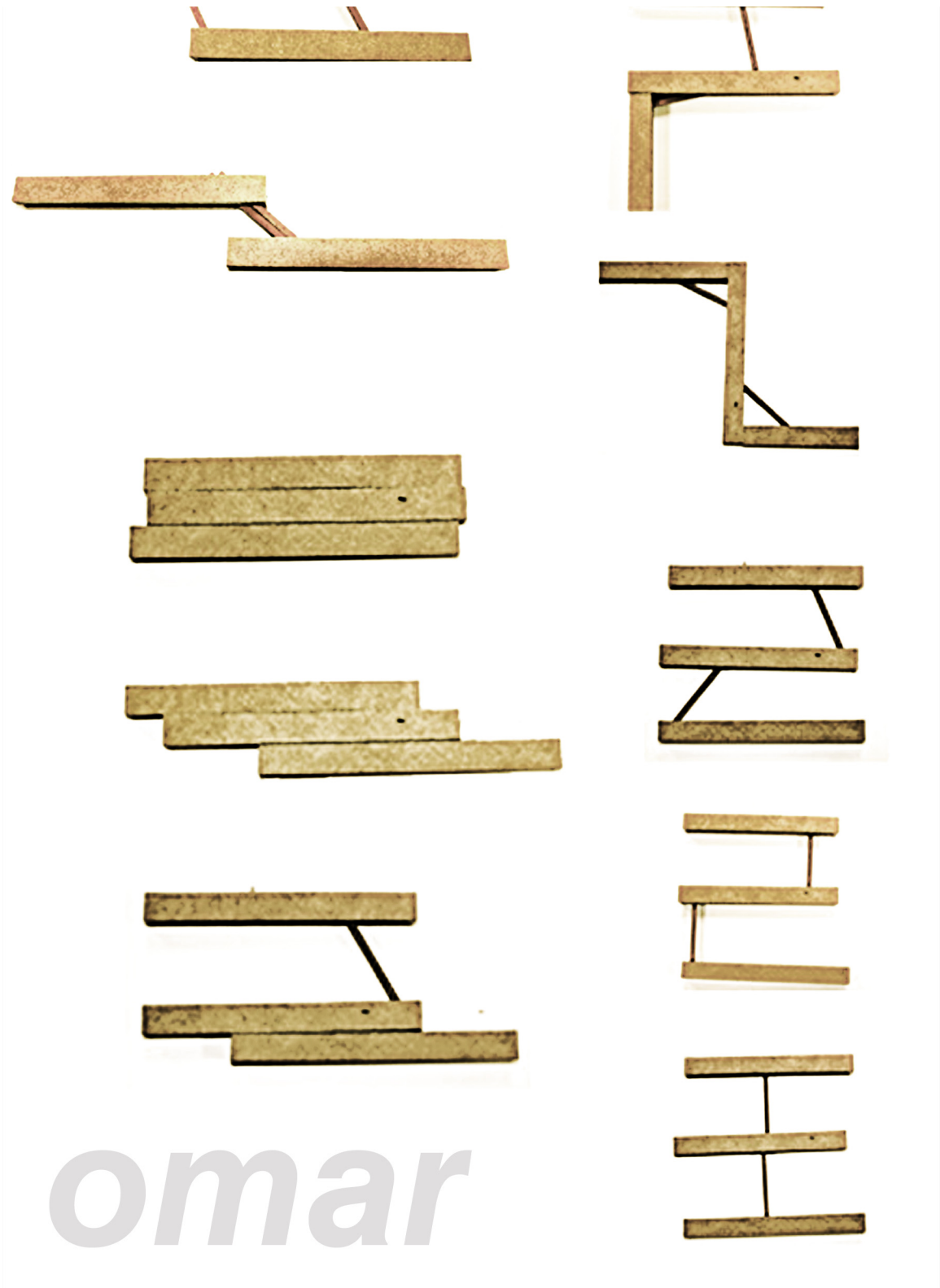
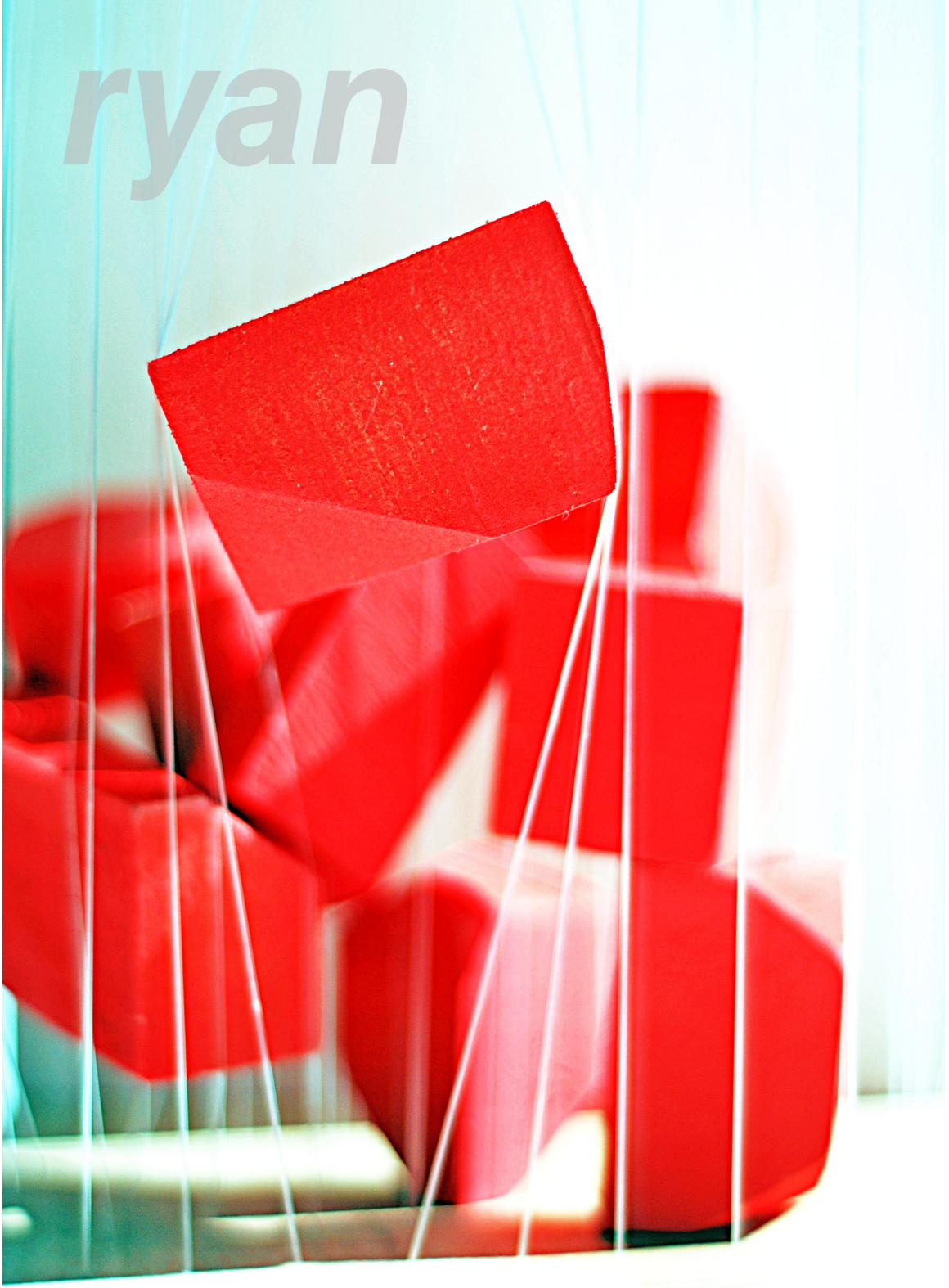43

leo

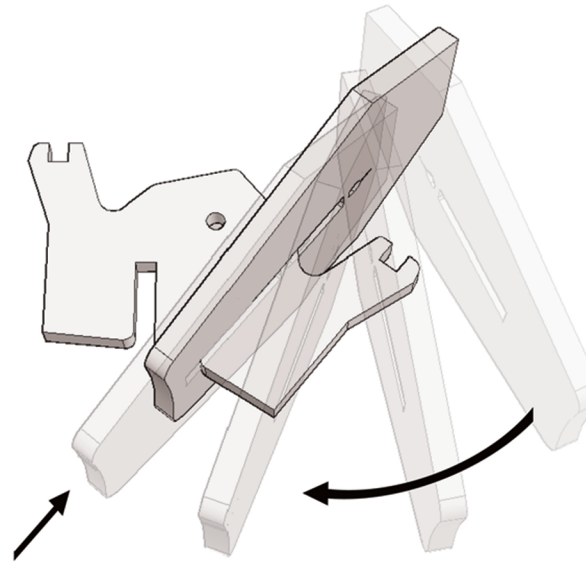Fig. 29.   Leonardo Morantin

44

Fig. 30.   Omar Saleh

Fig. 31.　　Ryan Swanson

evolution

Fig. 32.   evolution

The rest of the images in this document reveal a more evolutionary path to the process, where before there were many different ideas, now there are a few similar ideas, repeated and changed slightly, in order that I might begin to see what variances could come of it. The general pattern was: interlocking biscuits, rods, folds, connect many and see what comes of it. This series began with a simple figure ground study using a bold, capital "V." The layout began to suggest a herringbone pattern, and as I looked at it, a domain shift was iminent, as it ceased to be a graphic pursuit and crossed the boundary into possibly becoming three-dimensional. The diagram in figure 33 shows this evolution, and its parallelling with the elements of the play-process diagram.
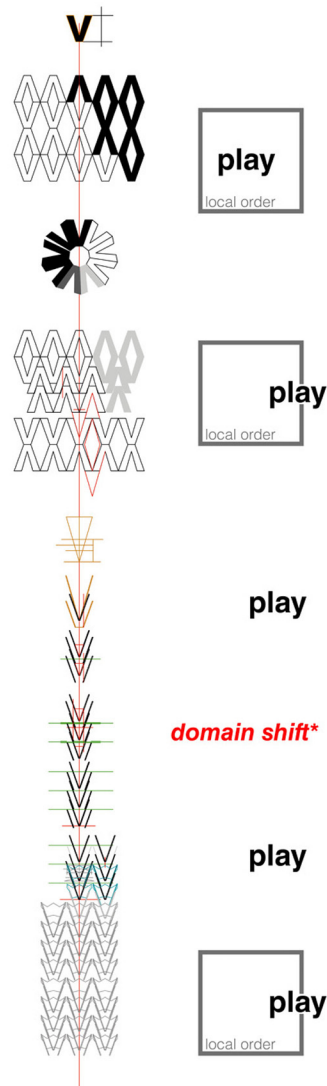
Fig. 33.   designing the vee

The vee study produced a tectonic architectural "blanket," that, when bent, would cam into itself and hold it's shape until it was disturbed. The components of this model were many of the pieces seen in figure 32, connected with dowels, into a fabric. The individual pieces were designed to snap together, anyone could build the object. This was not for any reason, it just followed from the simple logic I was using, and in the end it was so. It seems as though the honesty of the design process produced an incredibly simple object with incredibly complex quialities when assembled in large numbers. This is the formal diagram of a building: Many simple objects combined in large numbers to produce something complex. Figures 34 through 36 show the possibilities of this form.

Fig. 34.   the vee blanket

49

Fig. 35.   the vee "S" curl

Fig. 36.   the vee wave

Moving forward from this model, I wanted to explore the layering of multiple sheets of components, and how they might be connected. This produced a similar object with a few different pieces, but as it was highly complex in its assembly, and since I made the pieces too small for my own hands to assemble quickly, the idea was ultimately limited to one execution and I was unable to develop any lasting conclusions. This is, in part, due to my own limited attention span.

In the future, these studies could be reinstated and produce limitless fluid installation pieces. They could be ceilings, shading systems, sculptures, platforms for the propagation of lichens, beach cabanas, or clothing. These beginnings could be exploited for years-proving my point about the benefits of non-linear exploration. The images that follow are variations on this recipe.
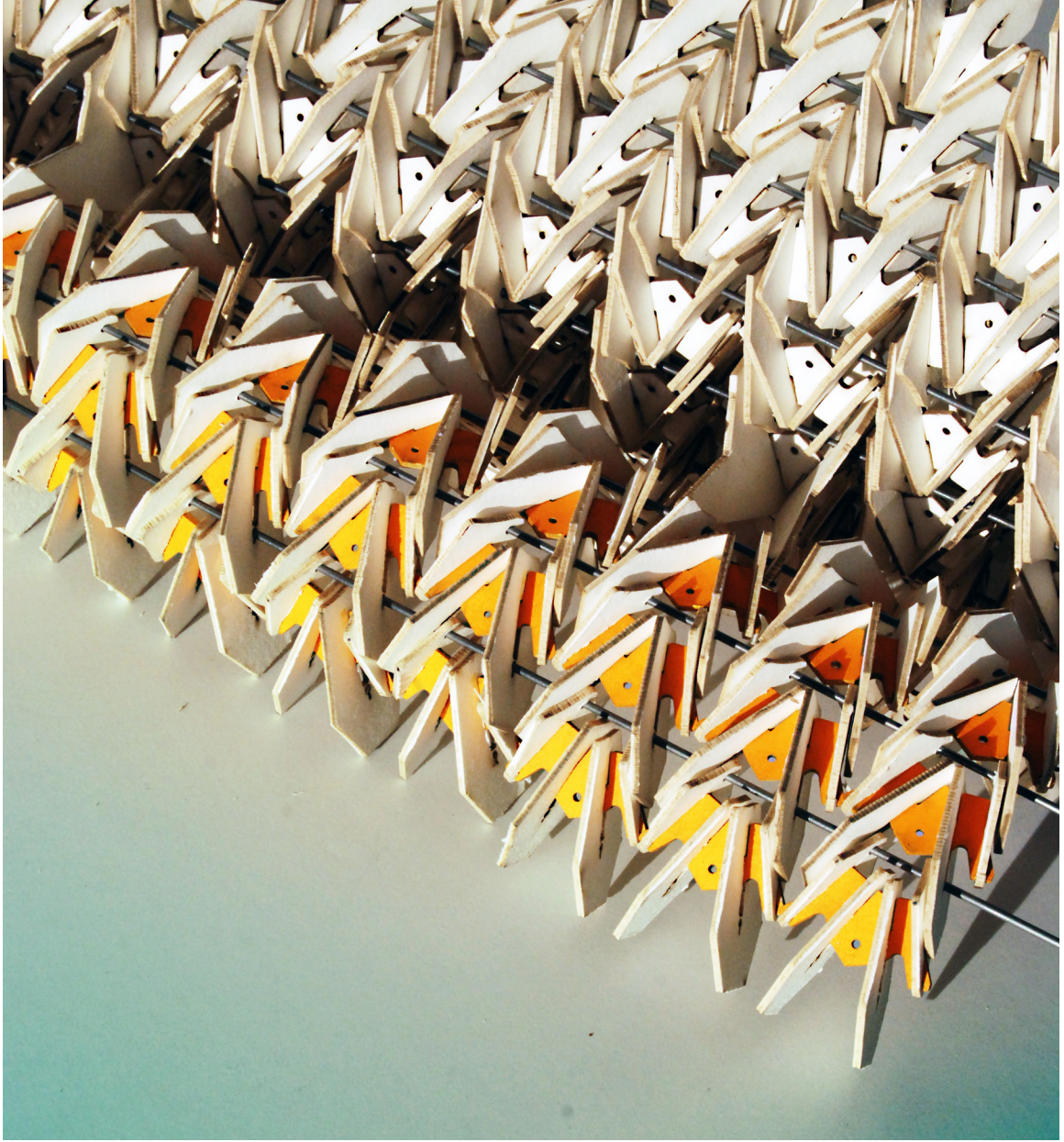
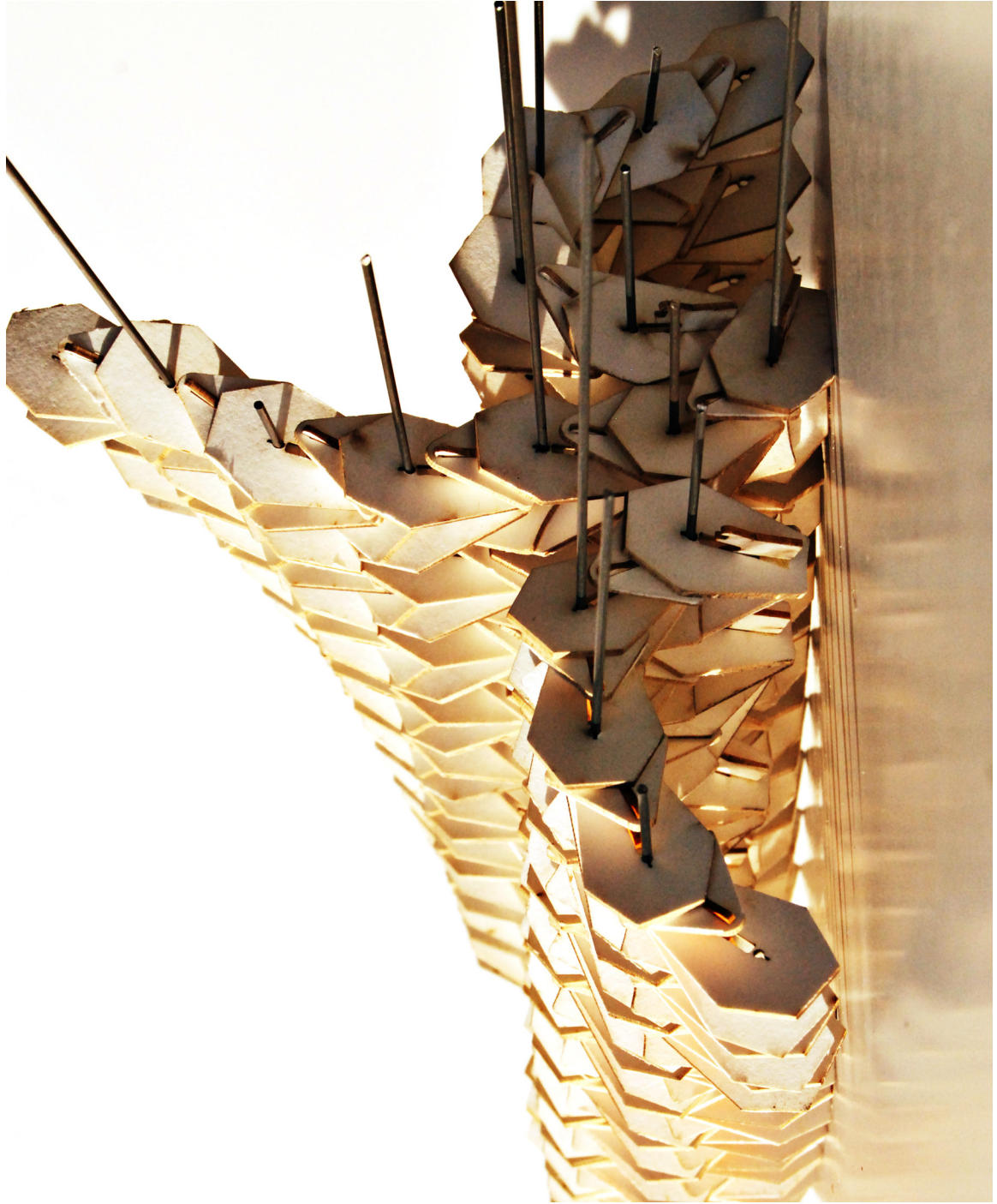Fig. 37.   variation 1a
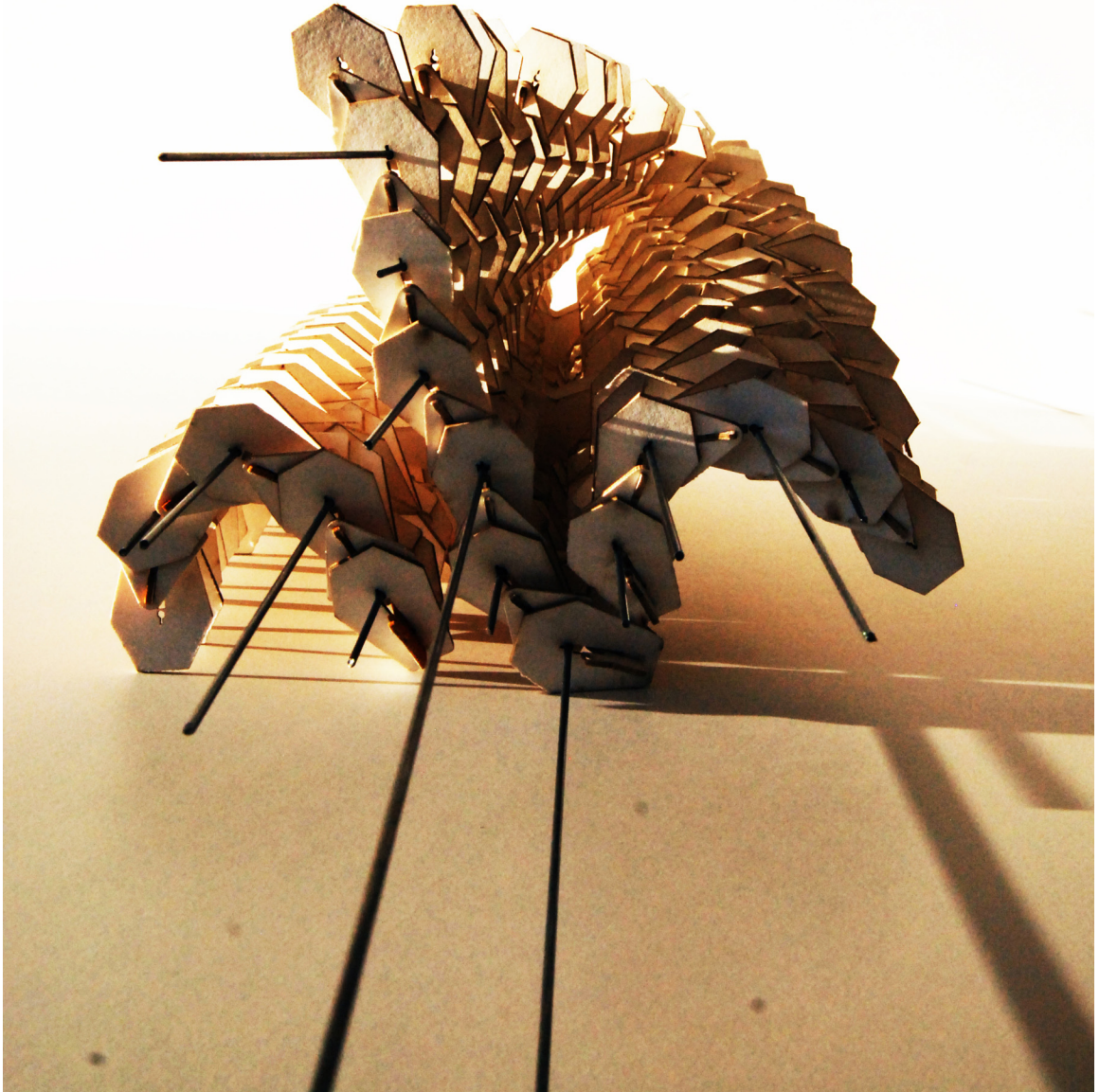
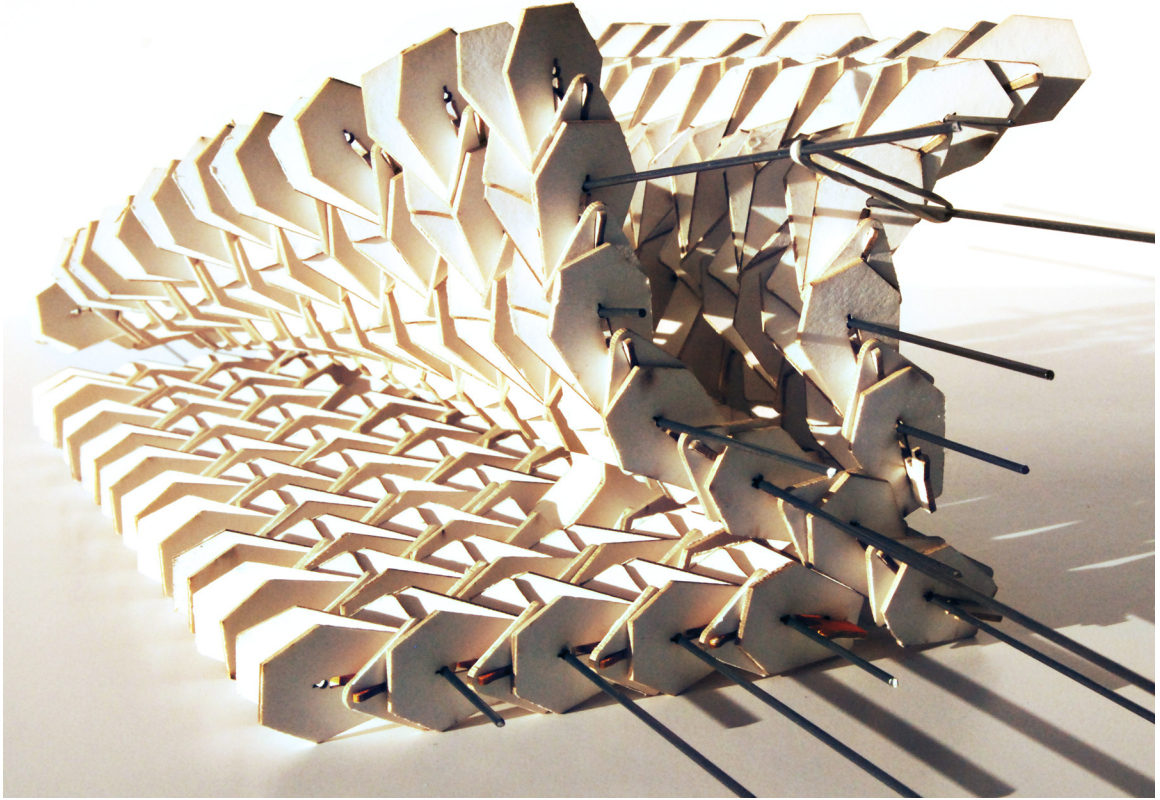Fig. 38.   variation1b

Fig. 39.   variation 1c
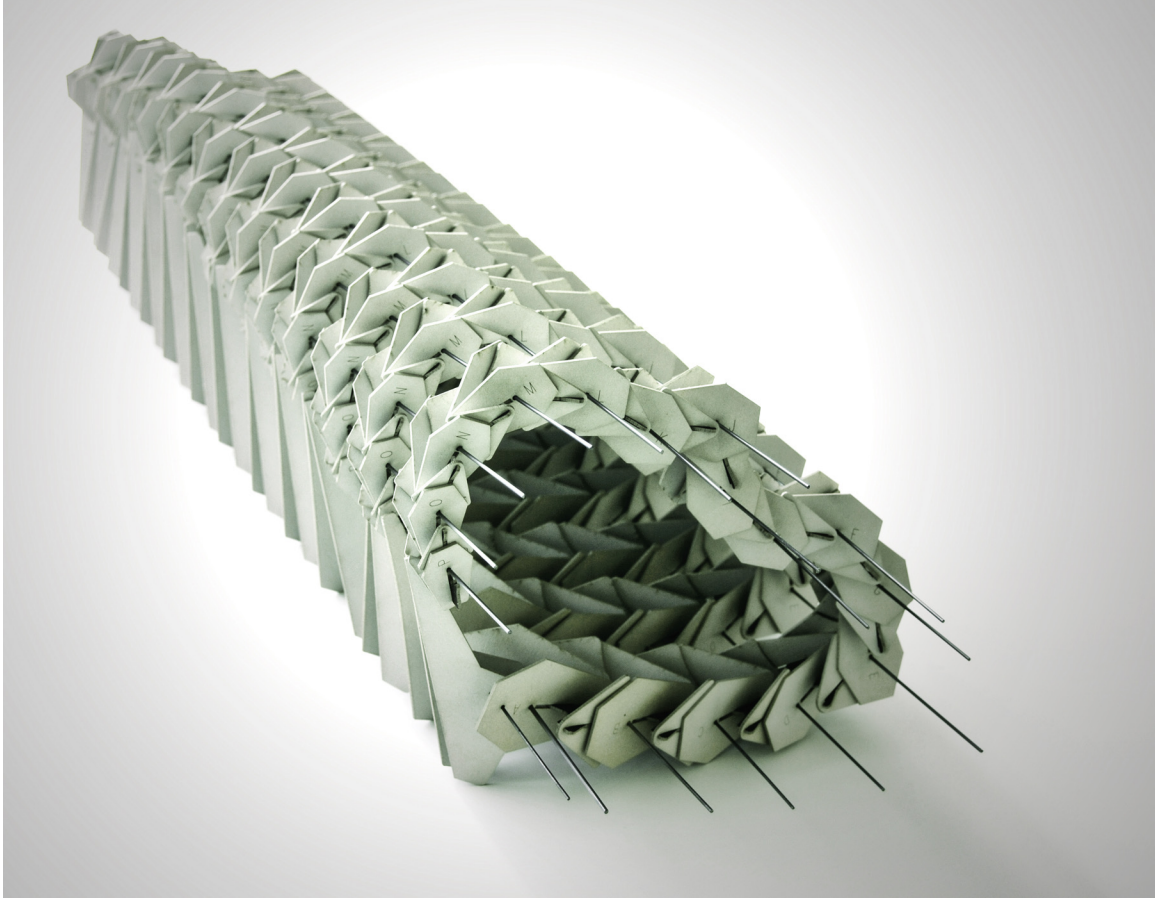
Fig. 40.   variation 1d
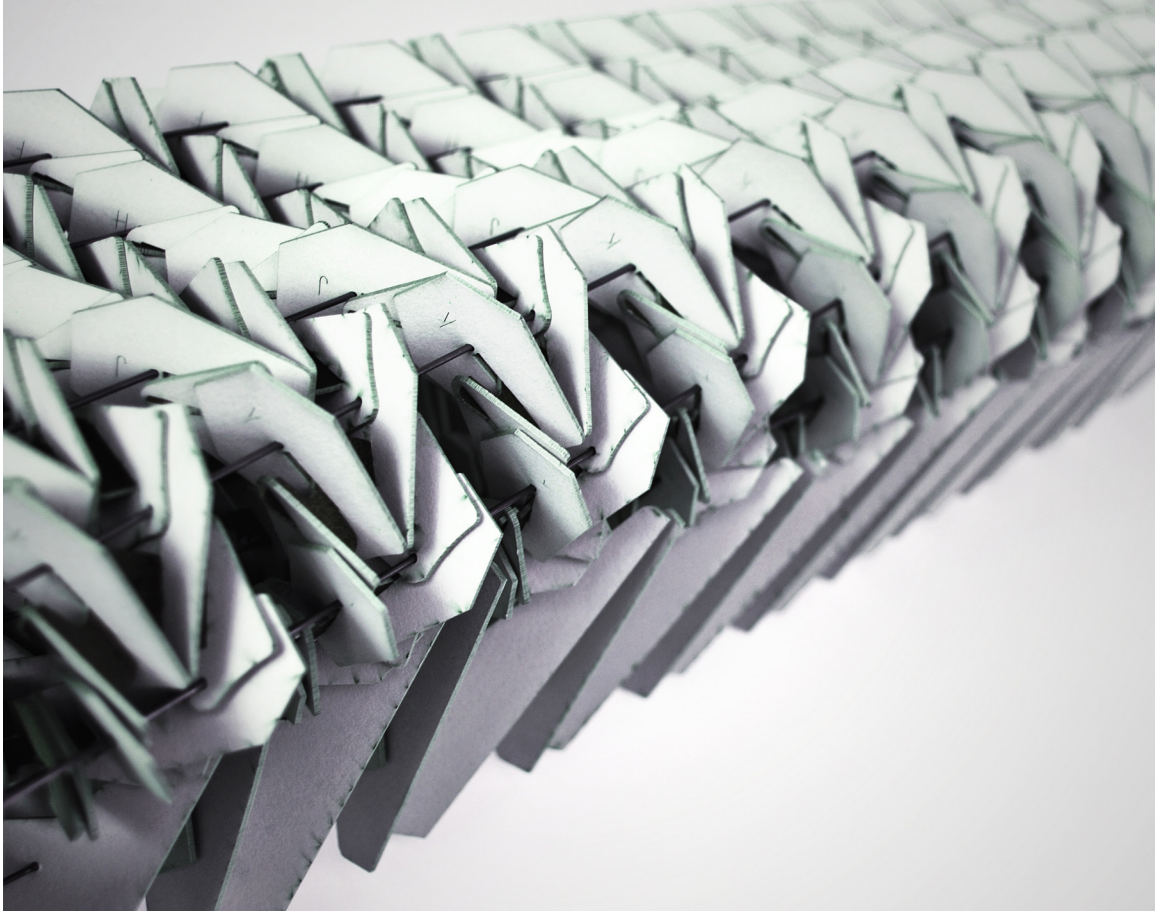
Fig. 41.   variation 2a

Fig. 42.   variation 2b

Seeking further variance, I began to work towards a constructed sheet that would allow rods to pass orthogonally to each other, in two dimensions, as three dimensions would produce more rigidity than I wanted. I began by hand, simply trying to create a construct that allowed the ninety degree relationship. Simulteneously, I gave attention to parts that would slot into the piece, and, by virtue of their angular entry, stay put if stressed.

This inquiry led to an initial construct, a more complex entity comprised of multiple, connected units of a revised construct, and finally a larger model. The large model utilizes several materials, investigating instances of transparency, light, and depth. In it's complexity, it becomes difficult to ascertain where one component ends and another begins. The interdependency of the system and its transitional abiguity begin to approach a complex level of wholeness. This wholeness, as it resembles, aesthetically, natural systems and forms, concurrently feels primitive- where here, primitivity and complexity find a similar host. The honesty of the process execution, dogmatic insistance on simplicity and repetition, and willingness to turn if a path is revealed, seem to allow for this sort of intricately-articulated rudiment to emerge.
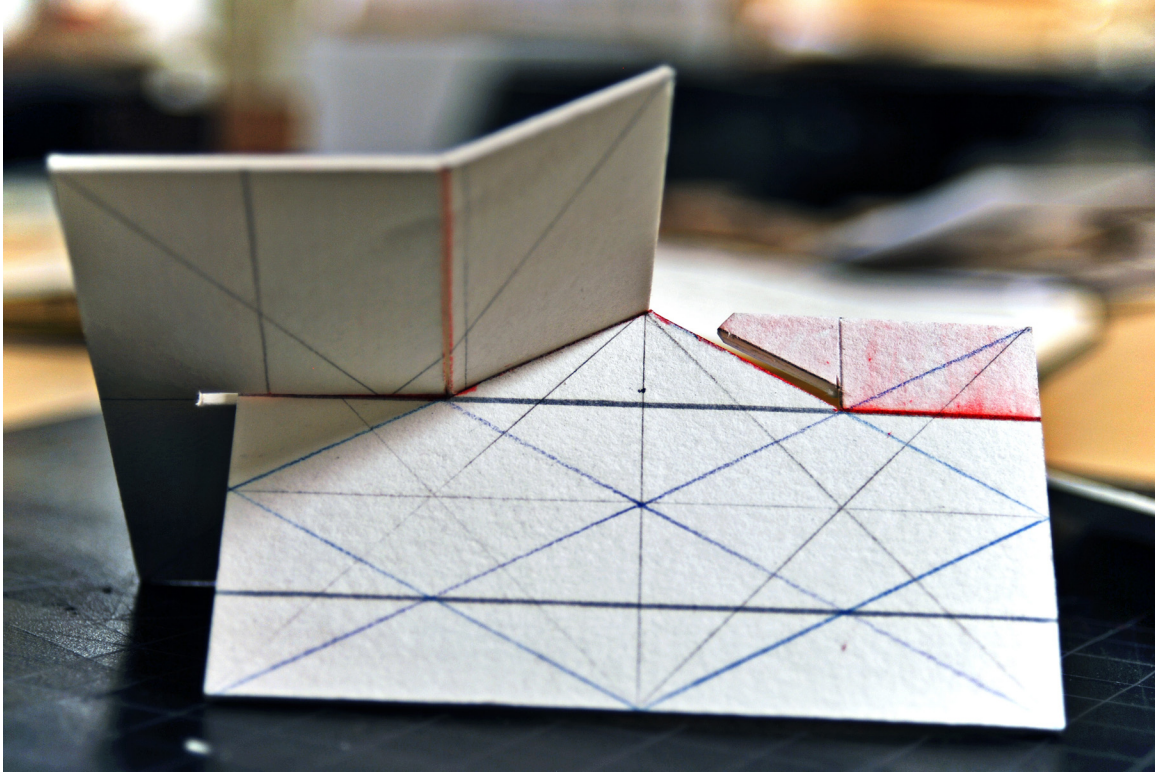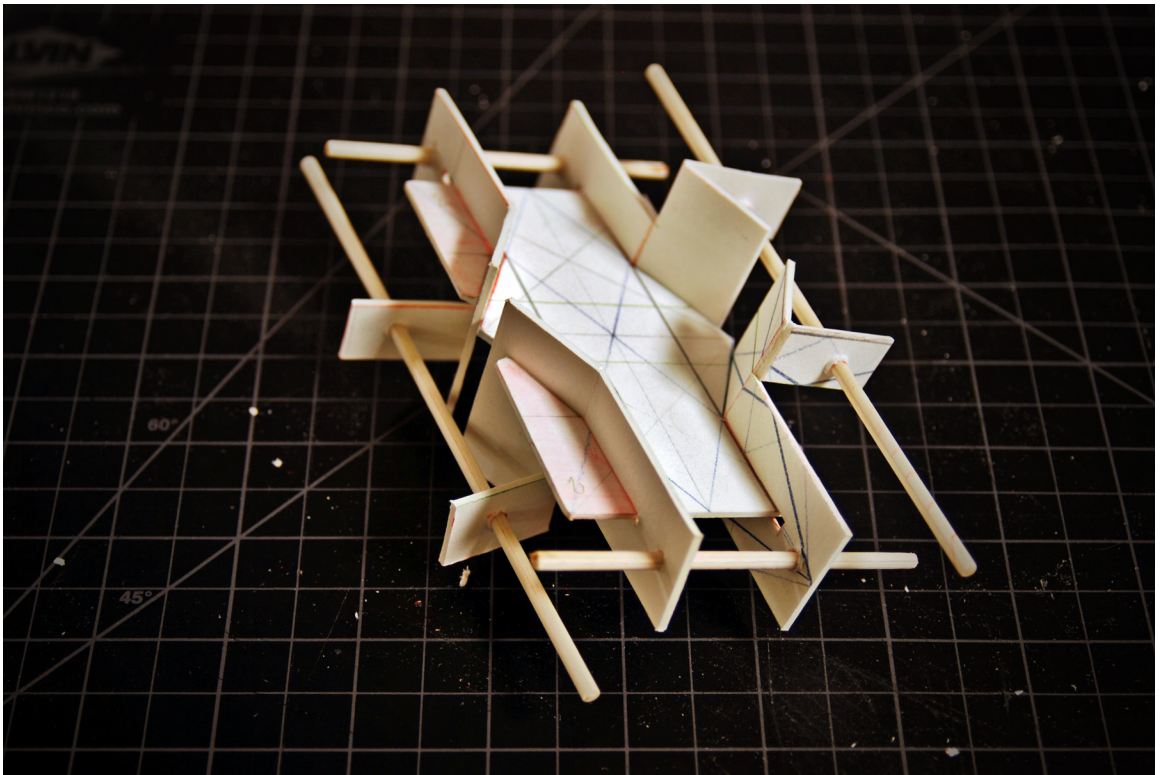
57

Fig. 43.   construct process

Fig. 44.   construct 1
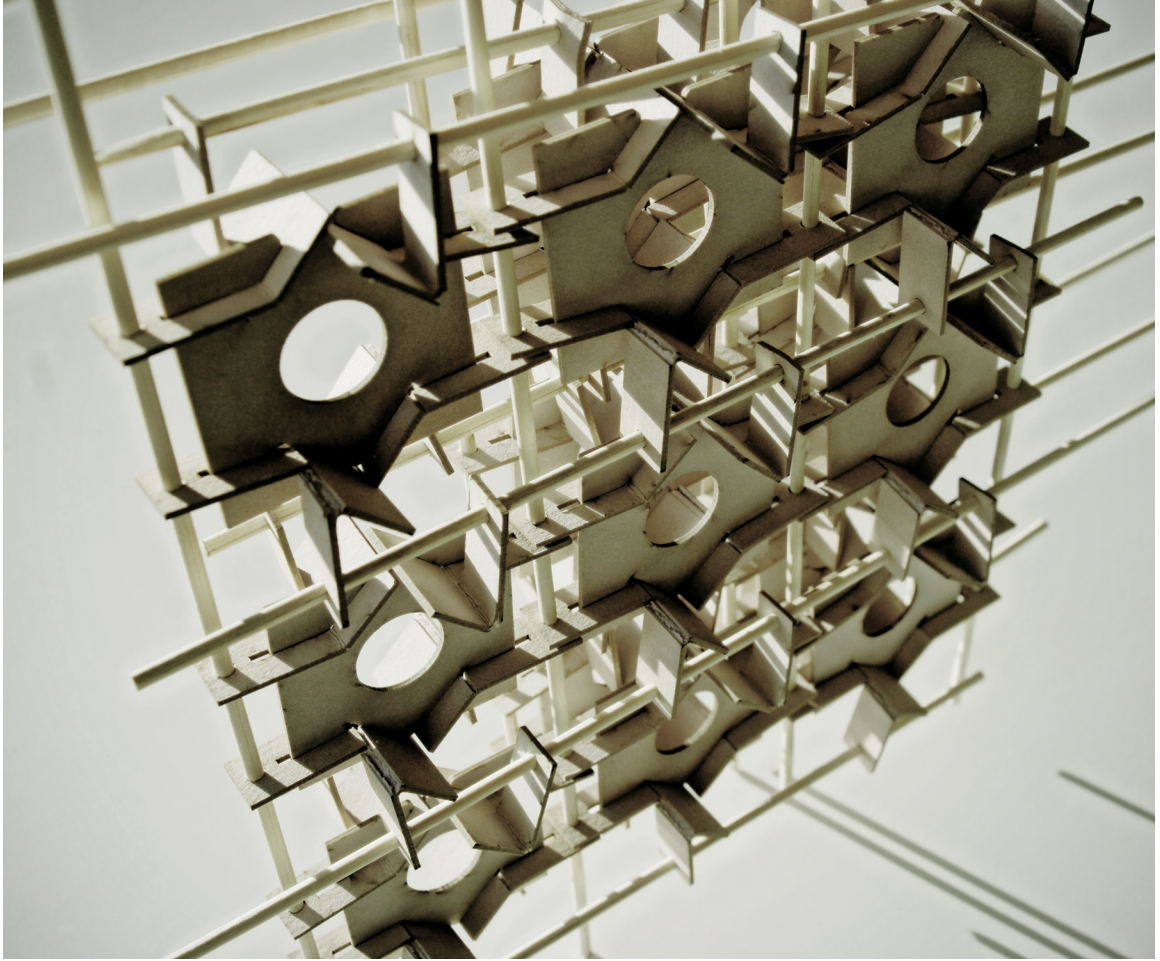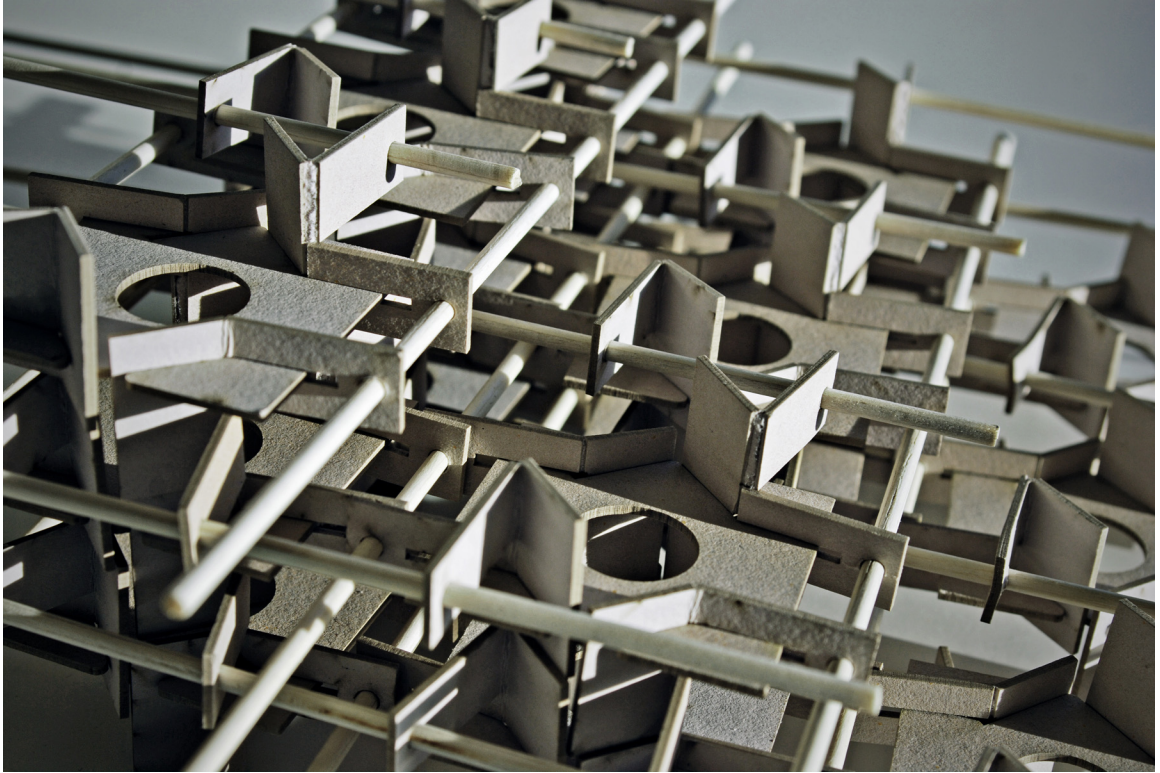
58

Fig. 45.　　construct 2

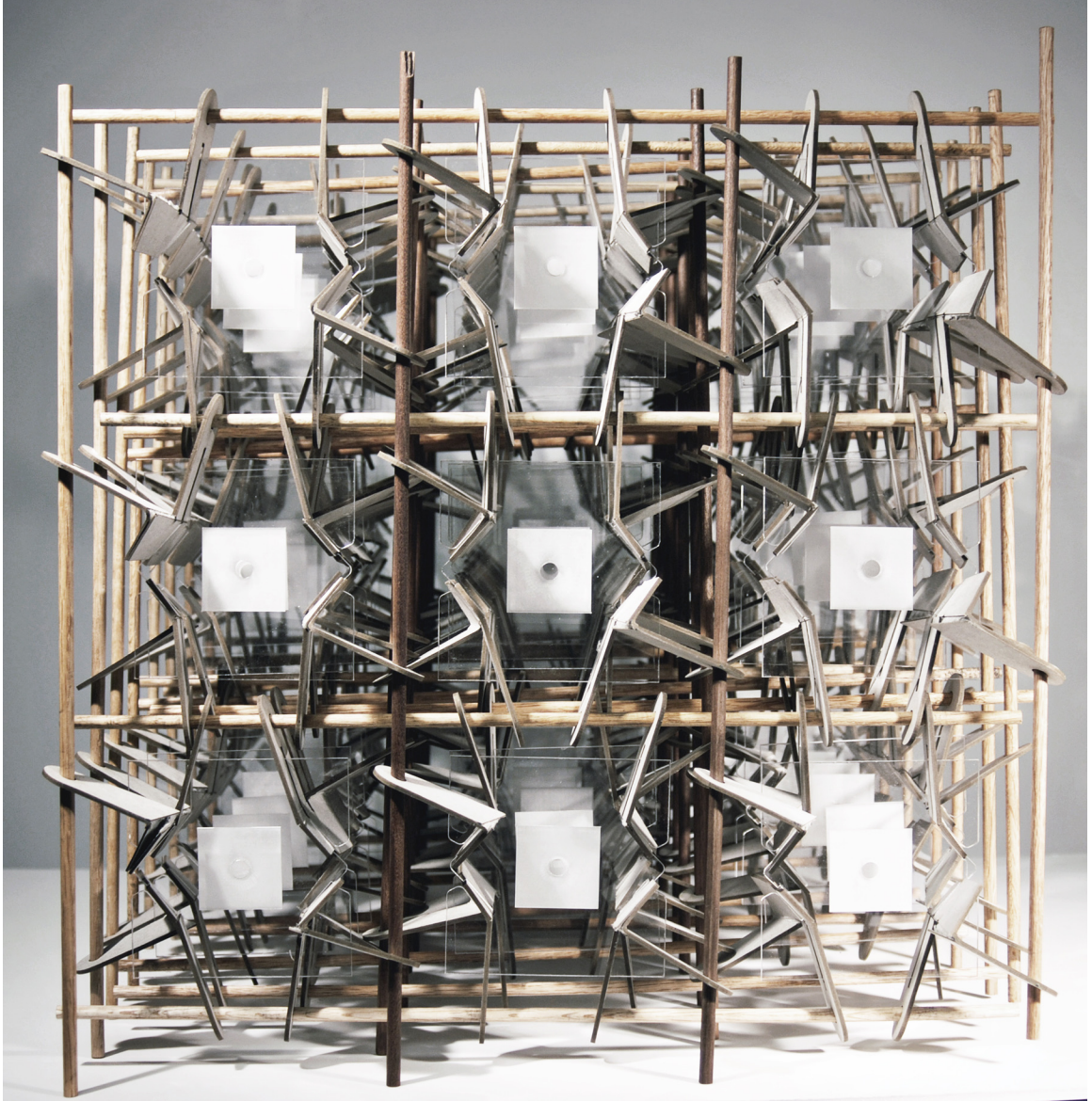Fig. 46.   construct 2a

Fig. 47.   model

Fig. 48.   model 2

Fig. 49.   model 3

Fig. 50.   model 4

Fig. 51.   model 5

65

It is challenging to wrap up a study of this nature. What's most important is a refusal to conclude. Rather than summation, restating, and finally packaging the knowledge, terminating the line of thought and the study, I prefer to suggest a beginning. Firstly, I would propose that an open-ended, quasi-unstructured, in a sense- boundless, project such as this is difficult to critique. I would challenge critics to liberate themselves from the pressure to critique. Instead, I invite you to engage with the images and objects and merely imagine. Imagine what goes into the design and fabrication of such objects. Imagine walking that path, how would yours differ? Imagine what the objects might be, architecturally or otherwise- at what scales they might exist, and how we might inhabit them, wear them, or how they might be articulated in another material. Imagine a process whereby you must impose your own tiny limits, or risk drowning in a sea of possibilities. Imagine curbing the need for completion, a resistance to conclusion. Imagine repeatedly forgetting what you think something will become, in order to multiply discoveries.

Secondly, I would postulate that many small discoveries add up to more than one large revelation. An accumulation of knowledge fragments is the stuff of *practice*. It is how you improve, get better, become masterful. It is not through a masterpiece that the master is born, but through everything that comes before, and so it stands to reason that one should find the place before mastery to be comfortable. There is vitality in this place, piled high with lessons learned and spare parts. There exists in this place the beauty of discovery, of effort, and of tangible manifestations of the imagination. The story of this place is somehow unique for each of us, but somehow similar for those of us who know its location. For the people who have been there, or are still there- looking for something under a pile of tools or books, this place is the closest thing to we know to home. It's what's inside, but on the outside, all around us.

Lastly, there are some challenges ahead that must be mentioned if this is to be a proper beginning. It will be tough to continue, knowing that growth happens before the culmination, before the actuality of a project plants itself firmly in the ground to begin its decay. This moment is where the architecture commences its physicality, complete, *built*. But this is not the moment of triumph for the architect. The architect's moment has happened all along, this is our place. We live in between inception and completion. We do not matter before the project, and we are no longer needed when it is finished. We must move ahead in careful contemplation of the place in which we reside, vigilantly cultivating it, staking our claim to this transitional territory. We must be sure that in the life of a project, this time is ours, everyone else gets the building, but we have only this time, and we must insist on its preservation.

Literature Cited

Clark, W.G. "Replacement." in Clarke and Meneffee, by Richard Jensen (New York: Princeton Architectural Press, 2000), 10-11.

Frampton, Kenneth. "The Case for the Tectonic; Rappel a l'ordre." in Architecturally Speaking: Practices of Art, Architecture, and the Everyday, ed. Alan Read (London: Routledge, 2000), 177-198.

Heath, Tom. Method in Architecture. New York: John Wiley and Sons, 1984.

Morrison, Jasper and Naoto Fukasawa. Supernormal. Baden: Lars Muller Publishers, 2007.

Negroponte, Nicholas. The Architecture Machine. Cambridge: The MIT Press, 1970.

Play. (2010). In Merriam-Webster Online Dictionary. http://www.merriam-webster.com/dictionary/play (accessed November 23, 2009).

Reiser, Jesse. The Atlas of Novel Tectonics. New York: The Princeton Architectural Press, 2006.

Scott, Edourne, Suite 101.com. "The Origin of the Word Play." http://languagestudy.suite101.com/article.cfm/the_origin_of_the_word_play. (accessed November 23, 2009).

Sennet, Richard. The Craftsman. New Haven: The Yale University Press, 2008.