RICE UNIVERSITY

Issues in the Development of a Formal Theme, or,
"How to Make a Building Look Good"

by

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A THESIS SUBMITTED
IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE

Master of Architecture

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MAY, 2003
ABSTRACT

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'Formal grammars' can be constructed from a body of designs. These grammars can be utilized as style guides, first by cataloguing and assessing the importance of certain redundant or novel formal attributes in a design/body-of-design-variations, and second by serving as a compositional 'rule-book' that facilitates the completion of designs-in-progress or allowing the extrapolation and therefore stylistic change in design variations.

Here, the architecture of Rice University served as a context in which to analyze, construct, and deploy formal grammars. This work explored the descriptions and limits of style and typology, specifically with reference to the design and addition of future buildings. A central question was, how much novelty/entropy (within a framework of order/familiarity) can a composition sustain before losing unity, before becoming a new type? Novelty and redundancy figured preeminently in the task of describing formal variations, and in the very assumption of a formal grammar.
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PREFACE

Dan Brueggert

Master of Architecture  Thesis Proposal

Rice University 2002-2003

"How to Make a Building Look Good" - or - Issues in the Development of a Formal Theme:

Phase I: classifying and articulating morphological characteristics.

Phase II: recording (and reacting to) formal constraints and mannerisms present in a design.

-consistency and redundancy as key features of coherent formal ‘grammars’

Very often, designers either knowingly or unknowingly assume personal formal constraints or attributes that reappear in their work. If and when these constraints and attributes are codified and articulated, they become known as a Style. Quite often this categorization is a historical explanation of the production of similar work, and the individual designers may either not be aware of common influences, or may not be consciously adopting similar constraints. It is then the historian that offers a generalization that brings a body of individual works into one category. These works with similar attributes reinforces the tendency to see a formal language as having a set of ideals, to which some designs come closer than others - a teleology that is pure fiction, but convenient and somehow compelling. At other times, however, the decision to produce similar work is indeed a conscious decision.

At the point when a collection of work (or a number of components of a larger piece of work) begins to exhibit formal similarities, something noteworthy has occurred. It is then that the rules governing the composition of those pieces become visible. At the heart of this thesis is the idea that all visual compositions are the resultant of two sets of decisions: those decisions concerning the design of elements, and those decisions concerning the nature of the relationships between the elements. This idea will form the basis for a visual diagram of the rules at work in formal composition.

(cont’d)
Hence, this thesis seeks to provide a classification system for morphological characteristics (Phase I). This classification and diagramming system will then be used to record the constraints and mannerisms that develop in a single design project (Phase II). Revelations from the second phase will be used to refine the classification model developed in the first phase.

This thesis will examine Style and visual appeal as the result of consistency between the two sets of decisions. How much novelty or entropy (within a framework of order or familiarity) can a composition sustain before losing unity? before becoming a new type?
Section 1: Overview of Similar Research

Styles [can be] defined in terms of formal systems called shape grammars. Shape grammars were introduced in the early 1970’s by George Stiny and James Gips as a way of describing and creating languages of design. A language of design was seen as a formal equivalent of the traditional notion of a style. Shape grammars could be used to characterize designs and styles in a way that was at once more precise than ways proposed within the established fields of art and architectural history, and more intuitive than ways proposed within the newly emerging fields of computer science and design methodology.

In 1978, George Stiny and...William Mitchell wrote of the characterization of architectural style:

Ideally this characterization has three main purposes:(1) it should clarify the underlying commonality of structure and appearance manifest for the buildings in the corpus; (2) it should supply the conventions and criteria necessary to determine whether any other building not in the original corpus is an instance of the style; and (3) it should provide the compositional machinery needed to design new buildings that are instances of the style.” (see images, p.2 )

Shape grammars are thus constraints for the formation of designs that codify two sets of decisions.

1) elements - type, number, or quality, and...

2) relationships between elements - offset distances, parallel or unparallel angles, instances of juxtaposition or overlap, etc.
Section 1: Overview of Similar Research

- Initial shape
- Shape rule
- Shape grammar
  
- Designs in the language

- Initial shape
- Shape rule
- Final state
- Shape grammar
  
- Designs in the language

- Initial shape
- Shape rules
- Final state
- Shape grammar
  
- Designs in the language

Section 1: Overview of Similar Research

The projects of Frank Lloyd Wright prove especially fertile grounds for shape grammar researchers, primarily because of Wright's fractal repetition of basic themes and heavy reliance upon similar organizing systems. In other words, Wright's works contain a high degree of what these researches call "shape grammar" - the degree to which Wright strays from this basic visual and formal patterning system is fairly low, compared to many other designers. Hence, his work is a natural place to start when discussing shape grammar.

Shape grammar is present in very diverse architectures. A series of Japanese Tea rooms exhibits a grammar based first upon the proportions of a tatami mat, or grid. The resulting rectangles (shape elements) are butted together at right angles (relationships between elements) to produce a number of designs in the grammar.
Section 1: Overview of Similar Research

T.W. Knight’s research into shape grammar provides us with an instance whereby a realized construction, in this case the church of Santa Maria delle Carceri, is assumed to have been composed with grammatical rules. (Whether the rules Knight deduced were actually in the mind of the designer is unknown - and of course there may have been design rules that are not presented in Knight’s example.) Here the church is analysed, and the predominant geometrical shapes are taken as two overlapping rectangles. (Another analysis could have taken the basic geometrical construction to be a central square with attached rectangles at its four sides, for example.) Knight then presents a grammar based upon this analysis.

1) vocabulary of shapes
2) spatial relations
3) shape grammar
4) derivation of a design
5) designs in the grammar
Section 1: Overview of Similar Research

Shape grammars provide a method for generating shapes with common constraints. George Stiny identifies four steps in the implementation of a shape grammar:

1) Find a sub-shape of the given shape that is geometrically similar to the left side of a shape rule.

2) Find the Euclidean transformation (translation, rotation, scale, mirror image) that make the left side of the shape rule identical to the corresponding sub-shape of the given shape.

3) Apply these transformations to the right side of the shape rule.

4) Substitute the resulting shape for the occurrence of the sub-shape in the given shape.
Section 1: Overview of Similar Research

Nikolai A. Ladovsky (1881-1941) described four ‘qualities’ of form, four rhetorical categories of expression:

Geometrical qualities: those indicating the relationships of sides, edges, angles, and surfaces.

Physical qualities: express the visual effect of an appearance of gravity, weight, and pressure on form.

Mechanical qualities: express motion and dynamic equilibrium.

Logical qualities: express relationships between elements, spaces, and used as a device for identifying boundaries of volumes.


Ladovsky cautioned that the “application of this (above) technique should not be developed beyond ‘the degree that is necessary in a given case’.” (VIA) He seems to be advocating a limited, instead of thorough and completely fractal application of shape grammar.

Nikolai V. Dokuchaev (1891-1944) suggested “three types of formal manipulation to provide perceptual clues about the apparent mass and weight of a form: surface treatment, surface details, and formal allusion. In the first type, the surface treatment consisted of the use of smooth textures to convey a feeling of relative lightness and roughly textured surfaces to make a form appear more massive. The second type involved the use of surface details, ranging from the fluting on a column to the joints in a rusticated wall and the layering and interpenetration of planes in the surfaces of abstract form. The substantial depth of penetration possible in such details tends to accentuate the mass of a form by accentuating the massiveness of its surface. The third type of formal manipulation, formal allusion, unlike surface treatment and surface detail, was directed toward affecting the appearance of the form as a whole. Such manipulation ranged from the use of a single form, such as an inverted cone, to suggest the movement downward of a single force, to the conscious deformation of a simple or compound form. The latter technique involved simulating the visual impression of gravitational pull suggested by an inverted cone through more complex and dramatic formal manipulations.” (VIA)
Section 1: Overview of Similar Research

Dokuchaev thus not only described kinds of formal operations, delimited by their purpose, scope, or site of application - but suggested psychological implications of performing such operations.

Krinsky, Vladimir F. (1897-1971):

Studio exercises from VKhUTEMAs that concentrated on the refinement of a formal theme through successive variations and the “deformation of form” (VFA). (see fig.) There is an implicit suggestion in the exercises that the forms are progressing along a teleological path similar to the sort that John W. Dixon discusses in “Notes Toward a Theory of Style.” Had the pupil created a different ‘second example’ than the one they did, we may be tempted to read the ‘natural progression’ of the forms in another way. A great opportunity is present at the creation of the second example - it is here that the possible development path of a family of forms is most influentially limited. Whatever elements do not carry over from the original into the variation are possibly excluded forever. William Hubbard, in Complicity and Conviction: Steps Toward an Architecture of Convention, discusses Harold Bloom’s six strategies of poetic development, shaped in this case into architectural variation strategies. If a new variation, for example, omits some detail that is present in the original - a strategy called ‘self-limitation’- one may take from such an instance the implication that the detail present in the original, now absent in later forms, was unessential to the expression of the greater architectural idea. One is tempted to read the first design as baroque, over-articulated, and possessing superfluous elements, as compared to its pared-down progeny.
Section 1: Overview of Similar Research

work from Ladowsky studio

work from Krinsky studio
Section 1: Overview of Similar Research


Using examples from both law and architecture, Hubbard shows how later works connect with previous works via their similarities, while their differences are opportunities used for framing critiques of previous works.

William Hubbard presents several judicial decisions, each of which draws upon a previous case to build its argument. He discusses the techniques used in rendering the later verdicts:

"The judges made their opinions plausible by showing how they submitted to the wisdom of their predecessors, but they made their opinions convincing by showing how they exceeded their predecessors. Further, we can see that the method they used was to cite an older decision and then tell us what the salient point of that decision was. In several instances, the new salient point was manifestly not what the original judge had in mind. But by seizing upon that point as the basis for his argument, the new judge was able to construct a new principle with reasoning that addressed the new conditions but gave the appearance of being rooted in the previous reasoning."

Hubbard connects this strategy of argumentation with a process Harold Bloom has described in literature, one in which recent works both connect to, and suggest a reinterpretation, of earlier works - to impress upon us their own merit. Hubbard continues:

"He (Bloom) points out that a new poem will appear worthy to us only when we can see it as having something in common with poems that we already know. But if a poet wants his poem to be seen as more than just a lesser restatement of those past works, then he must make us reread those past works in such a way that his new work will appear to us to be the greater. Bloom enumerates six 'ratios', six stratagems by which this revaluation can be accomplished in poetry."

Bloom's strategies are swerving, completion, focusing, self-limitation, refilling, and
Section 1: Overview of Similar Research

becoming-the-essence. Four of these strategies can be compared to addition/completion/variation techniques in architecture and visual design.

In **swerving**, "we see the new work as following the old work up to a point (thus establishing comparibility) but then swerving away from the old. But rather than seeing this swerve as a departure, we see it as corrective. The new work makes us see the old work as misguided from the point of the swerve onward, the new work as developing the ideas along more correct lines."

In **completion**, "we come to see the older work as incomplete, as not having followed ideas out to their logical end. The new work we see as completing the old, developing the full implications of the ideas."

In **focusing**, "the new creator shows us how the predecessor-works are unfocused...", and thus the new creator draws attention to a narrower point. (krinsky studio exercise)

In **self-limitation**, "the new creator sells us on the idea that, by deliberately limiting his development of the ideas, he has cut away the superfluous, allowing the essential to show through with greater clarity."

In each of these techniques, some relationship or elements from the initial design are referenced in order to advance a new 'argument' or 'reading'. Hubbard uses the Lawn at Jefferson's design for UVA, and Kresge College (MLTW) for illustrating the usage of such techniques in architecture.
Section 1: Overview of Similar Research

Wright's work frequently involves the usage of a special shape grammar described as the 'spatial weave' - another form of overlapping of elements, in which the boundaries of the elements become possible sites for poche. An instance of the fractal repetitiveness of a specific shape grammar in Wright's work is also shown below.
Section 1: Overview of Similar Research

Possible Palladian Villas: (George Hersey and Richard Freedman)

"Is is often observed that Palladio's villas embody geometrical rules. But there is less certainty as to precisely what the rules are. He wrote some of them down and hinted at others, but most have to be extrapolated from his work; and that is where the disagreements lie. Even assuming that agreement may one day be reached as to the nature of these rules, it could still be objected that in searching them out we have devalued the originality and genius of this architecture, that we have reduced Palladio to a game. And we do confess, certainly, that we have not attempted here to evaluate the man's genius - though of course we completely acknowledge it."

"Anyway, much art is game-like. Numerical analyses, counting, statistics, and the like often accompany artistic greatness. Homer, for example, is a poet with a strong sense of numerical and geometric design. This has been proved by any number of statistical and arithmetical ‘counts’, counts that involve symmetries within speeches, incidents, or plots in which the poet uses a device called ‘ring-composition’, and in meters and even word order. Sometimes Homer exercises these numerical constraints in an extraordinarily detailed and consistent way, though it is usually something the ordinary reader never notices. Thus Eugene O'Neill, Jr., shows that a word ending in a single short syllable is almost always avoided at position 7.5 in Homer's hexameters and that, in the ninth position in the line, with many possibilities to choose from, his word endings are almost completely limited to either short-long-long-long, or short-long-short-long. Consciously or unconsciously, Homer obeyed certain numerical rules. He counted, calculated, measured, and mirrored just as so many great artists have done in so many fields. Palladio did the same."

"Despite his partial silence on the subject, Palladio does seem to invite us to dig his rules out. But the very fact of publishing th Quattro Libri dell'Architettura (1570), with its plans, elevations, and details of ornament -
Section 1: Overview of Similar Research

parts of buildings, whole buildings and procedures for assembling given parts into new wholes - he presupposes a reader who might want to create his own personal selection from the elements provided. In other words the book itself is a set of rules, a set of possible plans, possible facades, possible details; rules, or possibilities, that are applied rather than articulated. So...we are simply taking up Palladio’s implicit challenge. ....we watch him play (or replay) forty-odd matches of his architectural game. Then we guess the game’s rules.”...

“One good way of divining the existence of a rule is to watch what happens when it is broken. Our method will be to create villa plans and facades based on Palladio’s ideas; but our designs will lead us gradually from his more obvious rules to his less obvious ones. As we continue the process, each time we make a mistake we will identify and correct it. Eventually we will produce plans and facades that, in our opinions at least, get really close to what Palladio himself would do. We do not do this in order to build new Palladian villas, though that is a perfectly reasonable possibility. Rather, knowing what Palladio would and would not do deepens our understanding of what he actually did.”...

“There are still advantages in our approach. For one thing, people examine and compare much more carefully when they have before them both an authentic work and a good imitation. The imitation teaches us things about the original that no amount of study of the original alone could do....Thus it is not simply a question of rules, even subtle ones, that are always observed. There are things Palladio always does, things he does only in certain specific circumstances, and things he does sporadically - just for the hell of it. The observations we are about to make, then, write a code for the stylistic analysis of plans and facades, a code that consists partly of unbreakable rules and partly of mere tendencies. Statistics establish just how strong or weak a given tendency is.”...(see fig.)

“The advantage of articulating these immanent rules is that they etch out, with hitherto unexplained clarity, the procedures and habits that distinguish this
great architect from all others. Knowing them makes it immediately possible to distinguish, in a quantifiable and unquestionable way, the work of imitators like Scamozzi, or Lord Burlington, or Thomas Jefferson, from Palladio’s authentic work. It removes architectural connoisseurship from the realm of instinct and sets it within that of the verifiable. By articulating the rules we newly define and clarify a great man’s individuality. In the end we shall find that Palladio’s rules, expressed and unexpressed, are as elegant as any geometric or algorithm. By showing this, by showing to what extent he was a natural geometer, we do not make him less the great architect; only the contrary, we show, in a way that gives more than mere lip service to the proposition, how great architecture may flow from geometry.”
Section 1: Overview of Similar Research

### TABLE 2.4

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<thead>
<tr>
<th>SPLIT TYPE</th>
<th>FREQUENCY (%)</th>
</tr>
</thead>
<tbody>
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<td>(a) Length greater than twice width</td>
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</tr>
<tr>
<td>Double horizontal</td>
<td>10</td>
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<tr>
<td>Triple horizontal</td>
<td>20</td>
</tr>
<tr>
<td>Quadruple horizontal</td>
<td>50</td>
</tr>
<tr>
<td>Quintuple horizontal</td>
<td>20</td>
</tr>
<tr>
<td>(b) Length greater than twice width</td>
<td></td>
</tr>
<tr>
<td>Double horizontal</td>
<td>27</td>
</tr>
<tr>
<td>Triple horizontal</td>
<td>27</td>
</tr>
<tr>
<td>Triple vertical</td>
<td>20</td>
</tr>
<tr>
<td>Quadruple horizontal and triple vertical</td>
<td>13</td>
</tr>
<tr>
<td>Triple horizontal and triple vertical</td>
<td>13</td>
</tr>
</tbody>
</table>

### TABLE 2.5

<table>
<thead>
<tr>
<th>ROOM SIZE [SQUARE FEET]</th>
<th>PERCENT SPLIT</th>
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</thead>
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<tr>
<td>CENTER ROOMS</td>
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<tr>
<td>&lt;300</td>
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</tr>
<tr>
<td>300-500</td>
<td>24</td>
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<td>500-700</td>
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<td>700-1000</td>
<td>25</td>
</tr>
<tr>
<td>&gt;1000</td>
<td>33</td>
</tr>
<tr>
<td>OFF-CENTER ROOMS</td>
<td></td>
</tr>
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<td>&lt;300</td>
<td>4</td>
</tr>
<tr>
<td>300-500</td>
<td>17</td>
</tr>
<tr>
<td>500-700</td>
<td>22</td>
</tr>
<tr>
<td>700-1000</td>
<td>100</td>
</tr>
<tr>
<td>&gt;1000</td>
<td>100</td>
</tr>
</tbody>
</table>
Section 1: Overview of Similar Research

Corbusier's Five Points of a New Architecture are a kind of proposition for a new typology, one which, according to their author, would be universally implemented. There is in Le Corbusier's plan a descriptive element, outlining the five essential components that would typify new projects [the free plan, the free facade, the rooftop garden, the ribbon/strip window, and pilotis], and a proscriptive element - the argument that these components were both desirable and necessary. In another instance, Le Corbusier was able to reflect on the body of his projects to identify another catalogue of forms. These exist at a massing-level scale, and may not mirror any parallel formal development at a smaller level within the projects. Thus they are a typology and not a rigorous shape grammar.

Typological Catalogues of the 19th Century:

Architectural theorists in this time period began assembling large typological groupings. How and where the demarcations for these categories were drawn is not completely understood. However, the categories did accord to intuitively obvious formal similarities.
Section 1: Overview of Similar Research

Krier has done two things: first, he has produced a catalogue of both building components and formal building typologies, second, he advances an argument that this pre-formed collection of components and types ought to be drawn from in the creation of architecture. There are thus descriptive and proscriptive elements to his work.

The examples shown illustrate groupings based on morphological similarities. First is a collection of stairs (a micro-typology) with rounded forms. These stairs are also nearly all completely massive, a characteristic that would by typological if only they all fit this requirement. The two examples shown at the lower-left are stairs that extend out over open space underneath. Notice that one of these examples, the upper or left-most, is not even curved at the stair itself - the curve only occurs at the plateau that the stair reaches. It seems then that this design either should not be included in the typology, or a new rule, with which all designs comply, must be discovered.

Second is a collection of buildings with T-shaped plans. Notice the generosity used in allowing designs into this last category. We observe a design at the lower-right with a rounded central portion, or a filleting of the intersection of the parts of the T. There is as well an instance of three squares at the ends of the arms of a T, each with a slight connection to a cylindrical central component. Several of the designs include, as arms of the T, a grouping of columns without an external perimeter wall. Therefore the total grouping is not limited to designs that take the exact shape of the letter T, but those that are very or somewhat similar. His grouping is therefore at least partially subjective.
Section 1: Overview of Similar Research

Iakov Chernikov has produced a catalogue of both 2-dimensional designs and 3-dimensional forms. His catalogue of 3-dimensional forms makes reference to tectonic strategies that are fundamental in the creation of certain compositions. In the 2-dimensional composition library, his groupings suggest intuitive shape grammar collections.

Presented first is an instance of overlapping shapes. The first row is composed of only orthogonal elements, while the lower two rows contain circular forms (elements rule). Additionally, the upper two rows contain no diagonal elements, while the lower two rows do contain such elements (relationship between elements rule). Furthermore, the upper two rows all abide by the rule of inverting the color of a shape (to white) as it crosses another shape - the lower rows do not exhibit this rule.

Next is a grouping of designs that appear to contain one line-weight and one offset distance between elements. Direction or orientation of the lines appears to be unconstrained, though each line forms a complete shape.

Again, we see a set of designs that all include (1) shaded, (2) overlapping, (3) quadrangles. These could very well be grouped into further sub-categories, provided we make distinctions between orthogonal arrangements and other-angled arrangements, usage or avoidance of squares, etc.
Section 1: Overview of Similar Research

images from Chernikov's formal vocabularies
Section 1: Overview of Similar Research

Form is the resultant of a series of known, stated, and seemingly randomly chosen, geometrical operations. In Diagram Diaries, Peter Eisenman charts the implementation of various geometrical operations on various projects throughout his career. This is perhaps the beginning of a classification system - though the exact information represented in this chart seems rather subjective. Why, for example, \textit{rotation} is listed as an operation performed on the interior of House III and not on Casa Guardiola, where it seems especially evident, is unknown. Why certain operations are listed as being applied to interiors and not exteriors, or vice versa, is also not clear. The chart is, if applied rigorously, a starting point for a morphological classification system.
Section 1: Overview of Similar Research

George Stiny's theory of shape grammar includes a chart for explaining the possible routes by which a grammar can be modified. Namely, there are three basic changes to be made to a grammar - the addition or deletion of a rule, or the modification of a rule. Under rule modification, a grammar may depart from an existing grammar by including new and different elements (shapes), or by including new relationships between those elements.
Section 1: Overview of Similar Research

A number of Wright's projects can be explained via the operation of formal moves. 'Twins' emerge among projects when a simple geometric operation can transform one plan into another, a phenomenon of great frequency, as illustrated below. This points not only to the existence of a highly consistent design methodology (a point not generally contested), but as well to a kind of mechanical approximation and redundancy that permits an algorithmic presentation of Wright's 'rules' - a way of qualifying/quantifying a previously inarticulate methodology.


reflection: Studio House to Jacobs House

rotation: Quadruple Block Housing v1-v2

asymmetric rotation: Storer House to Life House

contraction: Studio House to Heurtly House

oblique distortion: Gale House to Hanna House

spatial inversion: Willits House to Unity Temple

figure ground reversal: Wolf-Lake Park to Monona Civic Center

subtraction: Imperial Hotel to McArthur Apartment Building

addition: River Forest Tennis Club to Robie House
Section 1: Overview of Similar Research

Wright's work frequently involves the usage of a special shape grammar described as the 'spatial weave' - another form of overlapping of elements, in which the boundaries of the elements become possible sites for poche.
Section 1: Overview of Similar Research

Comparitive Diagrams Showing Hypothetical Transformations between Building Plans:

Romeo and Juliet Windmill - St. Mark's Tower
Hardy House - Fallingwater
Willits House - Jacobs House
Larkin Building - Johnson Administration Building
San Francisco Press - Nat'l Life Insurance Building

Storer House - Life House
Gale House - Hanna House
Imperial Hotel - San Marcos in the Desert Hotel
Martin House - Hollyhock
F.L. Wright Studio House - Guggenheim Museum
Section 1: Overview of Similar Research

Gregg Lynn utilizes examples from biological organisms to flesh out a theory of type evolution. Seen here is an example of a comparison between two fish - the grid is used to map congruent or similar points between the two animals. Variation can thus be described using a mathematical model, in this case, a Cartesian model.

"The typology of natural orders is always underwritten by the variable measurement of difference between and within species. For instance, the evolutionary transformation 'From Frog to Apollo', which appeared in the 1803 edition of Johann Caspar Lavater's Physiognomische Fragmente, exploited both the constellation of particularities and differences between the frog and the ideal man and a continuous and general faciality that registers these differences."

"Type itself is never present in a fixed state in an entire species..."

(Lynn, "Multiplicitous and Inorganic Bodies")

12–13. Cartesian deformation of diodon into mola
Section 1: Overview of Similar Research
Directed Industrial Design Changes:

Related in a way to the Krinsky/Dokuchaev studio exercise is the development of mass-produced items. In the yearly re-styling of a car model, for example, a team of designers must make the decision which elements of the previous model to keep intact, which elements to modify, and which elements to omit completely. If we look at the history of the Chevrolet Corvette, for instance, we can observe that the trademark four round tail-lights have remained largely intact, though somewhat compressed into a more ovular form, since the inception of the model. Other elements, the noticeable flaired arches above the front wheels, present in the Stingray or C-2 and C-3 body variants produced until 1982, are completely absent in the C-4 body style which emerged in 1984. Why were these elements judged not-essential to the recognition or continuation of the Corvette model? How many, or to what degree, can elements of the original design be modified until a model emerges that escapes the typology? Is the process of development, though consciously and intelligently guided in the instance of automotive design, a phenomenon similar to biological evolution, where new families emerge continually, and a single species can either belong to the end of one class of organism, or the start of another - or even be seen as wholly esconced within the lineage of a family, neither at its end or beginning. (Gregg Lynn compares a biological discussion of types to the analysis of inorganic form, and summarizes, “Type itself is never present in a fixed state in an entire species.”)
Section 2: An Analysis of Selected Rice Buildings

Brown Hall

Hermann Brown Hall is the first building in the study of selected Rice buildings. Built in 1968, it is an example of post-war modernism. Designed by the firm of George and Abel Pierce, it contains 58,066 sq. ft.

P.28 Initial survey drawings of Brown Hall
P.29 Study of the shape grammar of the long elevation, short elevation and sections - translation of building mass and metering into three variations
P.30 An analysis of the plan geometry of Brown Hall

Notice in both elevation and plan the geometry of Brown Hall is rectangular, and furthermore marked by strong tripartation (base/middle/top & end-cap, middle, end-cap). Facade and massing components are highly orthogonal.
Section 2: An Analysis of Selected Rice Buildings

Brown Hall
Section 2: An Analysis of Selected Rice Buildings

Hamman Hall

Hamman Hall is the second building in the study of selected Rice buildings. Built in 1958, it is an early example of the design work of the firm of George and Abel Pierce; it contains 22,424 sq. ft.

P.32 Isometric drawings of Hamman Hall courtyard side with scalloped loggia
P.33 Study of the shape grammar of the front elevation
P.34 Study of the shape grammar of the side elevation
P.35 Continued study of front edge

Notice again that the elevations of Hamman Hall are primarily rectangular, with most building elements being orthogonal. This building contains a number of novel elements (notably the scalloped shells at the courtyard facade, and the glazing at the front edges which runs vertically along the stair-space). In general, the degree of fenestration is fairly low (the building contains a theater). Tripartation is somewhat evident in the facades (column, scallop, brick-field).
Section 2: An Analysis of Selected Rice Buildings

Hamman Hall
Section 2: An Analysis of Selected Rice Buildings

Hamman Hall

[Diagram of Hamman Hall with various architectural details shown]
Section 2: An Analysis of Selected Rice Buildings

Hamman Hall
Section 2: An Analysis of Selected Rice Buildings

Hamman Hall
Section 2: An Analysis of Selected Rice Buildings

Herring Hall

Herring Hall is a noteworthy design of Cesar Pelli and Associates, built in 1984. It contains 52,961 sq. ft.

P.37 Overview of four ‘redesigned’ variations of Herring Hall, utilizing overlapping bar-shaped masses and use of courtyards to create negative spaces.

P.38-41 continuation of variations

P.42 Study of one ‘entry’ piece of Herring Hall

P.43 Study of one ‘entry’ piece of Herring Hall

P.44 Analysis of end elevation and section of Herring Hall, with correlated patterning on exterior

P.45 Drawing of both long elevations of Herring Hall

Notice again the elongated rectangular plan and elevations used in a Rice building. This building simulates the historical consequence of building programs at Rice, while collapsing it into one construction: a series of bar-masses that appear juxtaposed at their corners. Negative spaces, or courtyards, are created in and around the masses. Novel elements and materials are found in the entry pieces (usage of bevelled angles and curves, etc.). Polychromy and other decorative brick work is applied in the buildign, where the masonry skin is used to express the tectonic idea of bearing walls (lateral) with a criss-cross brick pattern to suggest infill walls.
Section 2: An Analysis of Selected Rice Buildings

Herring Hall
Section 2: An Analysis of Selected Rice Buildings

Herring Hall
Section 2: An Analysis of Selected Rice Buildings

Herring Hall
Section 2: An Analysis of Selected Rice Buildings

Herring Hall
Section 2: An Analysis of Selected Rice Buildings

Herring Hall
Section 2: An Analysis of Selected Rice Buildings

Herring Hall
Section 2: An Analysis of Selected Rice Buildings
Herring Hall
Section 2: An Analysis of Selected Rice Buildings

Herring Hall

[Diagram of architectural sections and elevations, illustrating similarities and design elements.]
Section 2: An Analysis of
Selected Rice Buildings
Herring Hall
Section 2: An Analysis of Selected Rice Buildings

Lovett Hall

Lovett Hall was the first Rice building erected, and thus has special formative status in the development of a Rice building lineage or typology. Lovett was built in 1912, designed by the firm which designed the original master plan for the campus, Cram, Goodhue, & Ferguson, and contains 50,735 sq.ft.

P.47 Overview of a series of design variations of the back (west) elevation of Lovett Hall

P.48 Study of three variations which exploit the metering of the original Lovett, while modifying some elemental geometries (v.1) critical vertical dimensions (v.2) or a host of thematic changes within the basic Lovett typology (v.3)

P.49 Modernist strategies: Two design variations which express the programmatic importance of the Founder’s Room, and alter the strong symmetry of the original design. (v.4,5)

P.50 A design which displaces the central sallyport, all other details unchanged (v.6), and a design with two sallyports, and an open Schinkel-style end (v.7)

P.51 Design variations which play off of the Lovett massing and arrangement to create hypothetical Meier (v.8) and Graves’ (v.9) Lovetts.

It is with Rice’s first building that the elongated-bar shape mass originated, and with its continuation, became typological. Lovett also contains evident broad symmetry (though there are minor deviations) and a stylistic theme predicated upon tripartation. The elemental components of this building serve as a number of model grammar rules (next section) that can be read into subsequent Rice buildings.
Section 2: An Analysis of Selected Rice Buildings

Lovett Hall

Lovett Hall: Original

Variation 1: Orthogonals

Variation 2: untitled

Variation 3: untitled

Variation 4: Asymmetry/ Founder’s Room

Variation 5: Asymmetry/ Founder’s Room

Variation 6: Shifted Center

Variation 7: Double Sallyport/ Open End

Variation 8: Richard Meier

Variation 9: Michael Graves
Section 2: An Analysis of Selected Rice Buildings

Lovett Hall

Lovett Hall: Original

Variation 1: Orthogonals
Variation 2: untitled
Variation 3: untitled
Section 2: An Analysis of Selected Rice Buildings

Lovett Hall

Lovett Hall: Original

Variation 4: Asymmetry/ Founder’s Room
Variation 5: Asymmetry/ Founder’s Room
Section 2: An Analysis of Selected Rice Buildings

Lovett Hall

Lovett Hall: Original

Variation 6: Shifted Center
Variation 7: Double Sallyport/ Open End
Section 2: An Analysis of Selected Rice Buildings

Lovett Hall

Lovett Hall: Original

Variation 8: Richard Meier

Variation 9: Michael Graves
Section 2: An Analysis of Selected Rice Buildings

Lovett Hall
Section 2: An Analysis of Selected Rice Buildings

Lovett Hall
Section 3: Rice Formal Vocabulary Designs

This phase of research involved identifying a set of rules, or geometric operations, that could be performed on a selected body of designs in order to account for their variability. Put another way, this rule-set is similar to a set of basic shapes and arrangements, that if available in some form of modelling software, would allow the creation of Rice buildings.

It is realized that the rule-set must be expanded when new buildings are included in the corpus - new buildings that are deemed as fundamental. Thus a rule set that deals strictly with Mediterranean styled buildings would contain different operations than one which dealt with 1960’s Modern buildings. Of course, a third rule set could be written that would encompass both, and indeed more. This rule set begins with Lovett Hall and Herring Hall to provide an example of such a process for design, and also includes ‘composite’ designs, hypothetical or possible Rice buildings, which are modelled after the Lovett-Herring inspired rule set.

Following this is a supplement to evolving thoughts about compositional analysis, the creation of such rule-sets, form/shape grammar, and the very notion of style.
Section 3: Rice Formal Vocabulary Designs

Morphological Classification System - Lovett Hall

origin

rule

rule

rule 3

rule 4

rule 5

rule 6

rule 7

rule 8

rule 9

rule 10

rule 11

rule 12

rule 13

rule 14

rule 15

rule 16
Section 3: Rice Formal Vocabulary Designs

Morphological Classification System - Lovett Hall

Lovett Hall-

origin: rectilinear volume of oblong proportion
rule 1: transverse symmetry
rule 2: longitudinal symmetry
rule 3: articulation of three floors, first a piano nobile, cornice above third
rule 4: alternating recession of elevation at floor levels
rule 5: density of articulation at first and second floor greater than at first
rule 6: scoring/division of building along long side
rule 7: scoring/division of building ends, along long side
rule 8: scoring/division of building ends, along short side
rule 9: raise of central portion of long elevation
rule 10: extension of central portion in plan
rule 11: alternating projections/recessions of mass as perceived from long elevation
rule 12: indentation/nesting along elevations
rule 13: semi-circular rounding of tops of recesses/indentations/nested forms
rule 14: alternating projections/recessions of mass as perceived in plan
rule 15: indentation of plan projections/recessions
rule 16: rounding of plan projections/recessions
Section 3: Rice Formal Vocabulary Designs

Morphological Classification System - Herring Hall

Herring Hall-

rule 17: shift in mass along long dimension
rule 18: offset in mass along long dimension
rule 19: projection of arch along upper edge of long dimension
rule 20: projection of triangular prism along upper edge of long dimension
rule 21: triangular projections in plan, along either side, of varying heights
rule 22: arc projections in plan, along either side, of varying heights
rule 23: application of triangular pattern to elevation, along either side
Section 3: Rice Formal Vocabulary Designs

Morphological Classification System - Composites

origin, rules:
3, 4, 6, 7, 8, 12, 19

origin, rules:
5, 9, 11, 17

origin, rules:
1, 3, 12, 16, 19, 22

origin, rules:
4, 6, 12, 14, 20
Section 3: Rice Formal Vocabulary Designs

Morphological Classification System - Composites
Section 3: Rice Formal Vocabulary Designs

Morphological Classification System - Composites
Section 3: Rice Formal Vocabulary Designs

Morphological Classification System - Composites

<table>
<thead>
<tr>
<th>origin</th>
<th>rule 1</th>
<th>rule 2</th>
<th>rule 3</th>
<th>rule 4</th>
<th>rule 5</th>
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</thead>
</table>

Lovett

Herring
Section 3: Rice Formal Vocabulary Designs

Morphological Classification System - Composites
Section 3: Rice Formal Vocabulary Designs

Morphological Classification System - Types of Variations

Variation Directly From Original:

Variation from Previous: Recursive Variation.
Each variant is developed from the model immediately preceding it. Although variations occur via manipulations to the form (n-1), a variation produced much later than the original can still return to precedents set by the original, that have not appeared in the history of variants. Each variant can be grouped within a row, to designate its affiliation with a prior or later design that shares some attribute or quality signified by that specific row - this graphic model can only track one attribute.

Variation Directly From Original: Occuring Alongside Recursive Variation.

Variation Toward Intended Result: Teleological Variation - or- Morphing. This is a process whereby a form is being modified to resemble a clearly known and visible result...
Section 3: Rice Formal Vocabulary Designs

Morphological Classification System - Hierarchies of Rules

**Hierarchy of Rules:**

Ordering of rules is based upon their frequency of application.

1. **Meta-Rule:**

   A rule to which all studied examples comply. Knowledge of it as a rule may not exist until this rule is broken.

2. **Common Rule:**

   Many examples within the sample exhibit compliance with this rule.

3. **Emergent Rule:**

   A few examples in the sample comply with this rule. It is emergent when the examples in compliance are later or more recent variants. It is a discarded rule when those examples in compliance are strictly early variants.

3. **Novelty (unruliness):**

   Only one example contains this ‘move’ or element. It is not yet a rule - it is only a rule when it appears at least twice.
Section 3: Rice Formal Vocabulary Designs

Morphological Classification System - Scope of Grammar Under Scrutiny

**Intercompositional Analysis*:**

The analysis of a number of separate compositions - the point is to determine: How much/In what ways, are these forms like each other?

**Intracompositional Analysis*:**

The analysis of what is considered to be an entire, independent composition - the point is to determine: How much/To what degree is a form ‘like itself’ - an examination of the internal consistency in design moves.

*: Depending on the frame of reference, a collection of objects could indeed be viewed as a whole - if this were to be done, the exercise would shift from being one of intercompositional analysis to being one of intracompositional analysis.

Likewise, a composition considered as an entire entity could thus be seen as a collection of disparate parts...

The issue is always one of ‘where does this composition end and another begin?’
Section 3: Rice Formal Vocabulary Designs

Morphological Classification System - Rule Writing Systems

**title**

1. *Inclusion* Oriented:
   - ’Rules’ as Possibilities,
   Options
   - Points at which Decisions
   must be made

2. *Exclusion* Oriented:
   - Rules as Constraints

**strategy**

- write shape-grammar to allow known desired degrees of novelty

- write constraints to exclude certain known examples with ‘excessive’ novelty.

**effect**

- as more components are introduced (options/possibilities), more results are made possible

- as more rules are written, the number of possible results decreases

**strategy mixtures**

- an elevation is given three sites in which a specific sort of articulation must occur - but articulation elsewhere is prohibited. (exclusion/exclusion)

- an elevation is given three sites in which a specific sort of articulation must occur - and articulation elsewhere is permitted. (exclusion/inclusion)

- an elevation is given three sites in which some form* of articulation must occur - but articulation elsewhere is prohibited. (inclusion/exclusion)

- an elevation is given three sites in which some form* of articulation must occur - and articulation elsewhere is permitted. (inclusion/inclusion)

*flush, no mat’l change an acceptable choice? a choice not to choose?
Section 4: An Analysis of the Rice Campus

The campus of Rice University was considered as a total composition, one whose rules must be understood, or more correctly, whose rules must be generated, before further design intervention could take place. This exercise studied the relational aspects of the buildings on campus, their alignments, and the nature of the spaces between them. Varieties of green spaces were identified and catalogued. Major and minor linear relationships were diagrammed, and the interplay of these two typologies were also pictorially generated. This exercise facilitated an understanding of the campus as a composition that can be matched up with a created set of rules, that both adequately describes historical development, and also proscribes future development.
Section 4: An Analysis of the Rice Campus

photograph of campus: Bldgs of (1) Greenberg, (2) Stern, (3) Machado/Silvetti, and (4) Graves yet to be built as of this the date of this photo.

diagram of campus illustrating mass of buildings (new buildings noted)
Section 4: An Analysis of the Rice Campus

A series of campus plans devised by Cram, Goodhill, and Ferguson

Plan as accepted by the Rice board of Trustees
Section 4: An Analysis of the Rice Campus

Roads:
1. When immediately adjacent campus roads, building massings tend to run parallel or perpendicular to the road-edge.
   a. The four directions of the inner loop govern most of these alignments - three exceptions being - the stadium and some smaller athletic buildings - Martel College, the massing of which is parallel or perpendicular to an entrance road and major parking area - and the buildings near the police station entrance along University Blvd.
   b. Buildings to be located in the zones indicated at left (1b) shall align major massings at 90 degrees to two datums established by the inner loop.
   c. Buildings to be located in the zones indicated at left (1c) shall align major massings at 90 degrees to the nearest campus building
   d. Buildings to be located in the zones indicated at left (1d) shall align major massings at 90 degrees to the nearest road
2. Buildings do not cross roads.
3. Buildings are typically set back 40 from city roads and 20 from campus roads
Section 4: An Analysis of the Rice Campus

Open Green Spaces:

1. There are six varieties of green spaces on the campus.
   i. Formal Quadrangles
   ii. Academic Quadrangles
   iii. Residential Courtyards
   iv. Cross-Loop Green Spaces (these spaces both contain streets, mainly the inner loop, and are largely surrounded by buildings)
   v. Athletic Fields
   vi. Green Spaces of Irregular Definition (these spaces may also contain streets, but exist outside the pattern of buildings along the inner loop, and are surrounded by buildings on no more than two sides)

2. Each of these green spaces can be described in terms of five characteristics:
   a. the shape of the green (negative) space
   b. its proportion
   c. its size
   d. the shapes of the buildings projecting into it
   e. the percentage of space that is enclosed by neighboring buildings

Formal Quadrangles: are rectangular, roughly 2:1 or 3:1 in proportion, measuring approximately 200-250 by 500-600, surrounded by building edges orthogonal to the four edges of the quad, roughly 50-80% contained by surrounding buildings.
   -generally with framed openings at middle of ends or sides
   -can contain appended courtyards orthogonal to main, often axially aligned with other court yards opposite the main

Academic Quadrangles: are rectilinear or L-shaped, ranging from square to 9:1, or 2:1 in the stack and leg of the L, with sides ranging from 40 to 600, surrounded by building edges orthogonal to the edges of the quad, 50% to 90% contained.

(images, following page)
Section 4: An Analysis of the Rice Campus

formal quadrangles

academic quadrangles
Section 4: An Analysis of the Rice Campus

**Residential Courtyards:** are nearly always rectangles (Martel contains a pentagonal courtyard), of 1:1 proportion, generally no larger than 150 on a side, and 120 on average, surrounded by building edges orthogonal to the four edges of the quad (wedge and cylindrical shapes intrude into the Weiss and Martel courtyards, respectively), and are all at least 75%, often 90% contained by surrounding buildings. -generally entered from points near the edges of their sides

**Cross-Loop Green Spaces:** are rectangles of oblong proportion, generally 3:1 or 4:1, in some cases more, range from 80 to 200 in width, and occur in segments generally 200 -300 in length, surrounded by building edges orthogonal to the four edges of the green spaces, and at least 50%, though sometimes 70% contained.

(images, following page)
Section 4: An Analysis of the Rice Campus

residential courtyards

cross-loop green
Section 4: An Analysis of the Rice Campus

Linear Relationships:

Edges/Alignments
Axes
Pedestrian Paths

Edges/ Alignments:

1. Several buildings extend to or are situated upon common lines that inform the siting of major massing elements or the extents of minor elements, of other buildings, as well as form the edges of open spaces.

2. These alignments most often correlate to buildings that are immediately adjacent one another, though occasionally buildings will share a common edge or alignment while having un-aligned buildings between them.
Section 4: An Analysis of the Rice Campus

overlay of prominent axes and bldg. alignments

building alignments

extensions of building alignments

bldg. alignments (bold) and their extensions
Section 4: An Analysis of the Rice Campus

overlay of bldg. alignment extensions, major axes, and cross-loop green spaces

overlay of bldg. alignment extensions, major axes, and all green spaces

overlay of bldg. alignment extensions and cross-loop green spaces

bldg. alignments (bold) and their extensions
Section 4: An Analysis of the Rice Campus

overlay of bldg. alignment extensions, major axes, and residential green spaces

overlay of bldg. alignment extensions, major axes, and residential green spaces

overlay of major axes and residential green spaces
Section 4: An Analysis of the Rice Campus

overlay of bldg. alignment extensions, major axes, and formal quadrangles

overlay of bldg. alignment extensions, and formal quadrangles

overlay of major axes and formal quadrangles
Section 4: An Analysis of the Rice Campus

overlay of bldg. alignment extensions, major axes, and academic quadrangles

overlay of bldg. alignment extensions, and academic quadrangles

overlay of major axes and academic quadrangles
Section 4: An Analysis of the Rice Campus

Axes:

1. Axial relationships exist between several of the buildings on campus, the major and minor axes being noted below.

Pedestrian Pathways:

1. Several pedestrian pathways are permitted to organize openings in buildings.

2. Some of these pathways serve doubly as axes for larger campus building arrangement. (marked with circles at the ends of the axes, below)
Section 5: Design for School of Architecture Annex, Site No. 1

As a test for the building composition rules generated from the Rice campus and its collection of buildings, a site and program was needed for the development of a sample design - one which utilized and tested the created rulebook. The possibilities for the design were meant to display the diversity of possible solutions that may emerge even with strict compliance with the recognized patterns, while also demonstrating the ‘loop-holes, or peculiar instances where a design may vary from the precedents on campus while still not violating the pattern-language. The issue became one of trying to identify the limits to which the typology of a ‘Rice Building’ could be stretched.

The first possible site was the open space immediately west of Anderson Hall, and immediately north of Fondren Library. A program was devised, as follows:

Annex - Architecture School:

1 Workshop Studio - easy physical and visual access to the maintainence paths and courtyards
   -storage space for above studio
   -upper cat-walk and hoist capability, taller ceiling to accommodate fabrication of
   full-scale pieces
2 Electronic Studios - with means for controlling daylight admission
   -space for twenty students in each
1 Exhibit Gallery in the entry of the building, to accommodate changing exhibits of student work
2 Restrooms, 1 male and 1 female, 300 sq.ft. each
1 Work/Photocopy Area, 120 sq.ft.
1 Lounge/Mini Food-prep Area, 150 sq.ft.
8 Staff Offices 120-150 sq.ft. each

The school annex was conceived as a ‘twin’ to the existing Anderson Hall, designed by James Stirling and Partners in 1981. The elevation and massing take cues from this building, and subsequent changes from the Rice typology are extrapolations of the novelty found within Anderson Hall.
Section 5: Design for School of Architecture Annex, Site No. 1

Inner Loop Road

Site

Fondren Library

Anderson Hall
Initial Massing Scheme

-mass conceived as extension to elongated bar that is typical of Rice buildings, and is displayed in each wing of Anderson Hall.

-new mass is similar to a replication of this bar, with a space preserved inbetween for pedestrian traffic
Section 5: Design for School of Architecture Annex, Site No. 1

Four massing studies, essentially elongated bars similar in width, length, and cornice height, to Anderson Hall were modelled. Major plan and elevation guidelines were abstracted onto a grid, in order to understand the proportional systems at work in the studies. Each conformed in some measure to the others - they were, after all, variations on a theme, *fugues*. Novelty was allowed in each, and the grid provided a mechanism to locate the site and degree of novelty. (These models are analogous to the ‘strategies’ listed on p.66 in Section 3, where given sites and zones either allow, demand, or exclude articulation).
Section 5: Design for School of Architecture Annex, Site No. 1
An initial study examining the building as an elongated bar, with horizontality strongly articulated. Louvred skylights allow adjusted light admission, while the lower studio features wrap-around glass for public viewing and involvement.
A second study utilizing the roof form of Herring Hall, while deploying it in the massing envelope of an Anderson Hall. A ridge-skylight admits light for upper studios, while a horizontal brim around the lower studio recalls overhangs common of many 1960's buildings on the campus.
Section 5: Design for School of Architecture Annex, Site No. 1

The first proposed addition took the form of an elongated bar, leaving a gap between itself and Anderson Hall, to allow pedestrian access south toward Fondren Library. This path sets up a line over which the massing proportions of Anderson Hall is copied, to produce a new design similar in metering to its existing neighbor (see diagram at right). Studios are contained in b, and b', while circulation is contained in a, and a'

A large design studio is placed closest to Anderson Hall, while additional program elements extend westward. After the mirrored-massing phase of the new design ‘ends’ with b'(the studios) and a'(circulation) there is a return to an expansion field, which houses largely service elements, and the building ends on the west side with a square block containing academic offices.

True to the patterns of redundancy and novelty among other Rice buildings, this design is constructed of fields of masonry with more sculptural elements of concrete. Entry points to the building are seen as key places to introduce novel forms - so variation from (or more correctly, ‘away from’) Rice precedent is practiced and could plausibly be allowed. What makes this stylistically consistent is the application of a rigorous shape grammar, which not only prescribes patterns that are followed, but also describes the ‘pattern’ to idiosyncracies of the campus’ buildings. Variation definitely occurs; it just so happens that such novelty can be described in non-random terms.
Section 5: Design for School of Architecture Annex, Site No. 1

Design sketches exploring articulation of studio bar (left), entry recession (middle), and academic box (right). This is a usage of tripartation, a Rice pattern. These sketches also exhibit vertical tripartation, with a base to waterline, middle (with masonry infill), and top (of concrete).
Section 5: Design for School of Architecture Annex, Site No. 1
Section 5: Design for School of Architecture Annex, Site No. 1
Section 5: Design for School of Architecture Annex, Site No. 1

Diagram descriptions:

- Round element
- Sliding cantilever windows
- No lower "perimeter" vertical circulation entry
- U-shaped contains...
Section 5: Design for School of Architecture Annex, Site No. 1
Section 5: Design for School of Architecture Annex, Site No. 1
Section 5: Design for School of Architecture Annex, Site No. 1
Chapter 5: Design for School of Architecture Annex, Site No. 1

Styles or shape grammars can be considered as rules governing the articulation of a basic shape or volume (Section 3, p.66), one that is loaded with sites, zones, or intersections where: [no/some/specific] articulation [cannot/may/must] occur. The diagrams and sketches below begin to illustrate an approach of this sort, termed the 'Mr. Potato-Head' model of style and typology. All of the examples on the previous page (p.97) begin as basic elongated bars of a volume, width, height, and length commensurate with typical Rice buildings. An articulation zoning-guide is applied to the surface of the mass, as with the cubes shown below, and then manipulation occurs.
Section 5: Design for School of Architecture Annex, Site No. 1
Section 5: Design for School of Architecture Annex, Site No. 1

These facade models illustrate the possibility for Rice buildings to begin to extrapolate current present trends. First, brick masonry has increasingly been used as a sort of skin (re: the filtered brick walls along open-air stairways of the science buildings/ the delineated frame and infill brick of Pelli’s Herring Hall). Second, tripartation is being used horizontally and vertically. Third, uninterrupted stretches of building mass typically run for no more than 160’. Fourth, novel shapes begin to appear at entryways of buildings, as well as in the expression of internal circulation. This variation series (shown below and continuing to page 102), finalizes the design for an Architecture Department annex at the first chosen site. The designs are placed in chronological order of ‘variation from the model’, and or ‘extrapolation of present trends’.
Section 5: Design for School of Architecture Annex, Site No. 1
Section 5: Design for School of Architecture Annex, Site No. 1
Section 6: Design for School of Architecture Annex, Site No. 2

This second site, really another design strategy, was chosen in order to investigate the problems involved in a literal addition - an addition to Stirling's 1981 Anderson Hall. Stirling himself added to an even earlier architecture building; this process is documented in the following pages. One could even look at Stirling’s work, in this instance, as a design that unfolds through the logic of a shape grammar. For this latest proposed design, a pattern-book was created that documents (p. 107-114) the moves Stirling made in making the first addition. The final design is modelled as an addition to an addition - one that reinforces key moves and attitudes.

The site for this proposed addition is directly to the east and north of Anderson Hall. This design borrows from the program developed for the first design (Section 5), but is not as large due to the more restrictive site. In total, the new addition adds approximately 10,000 sq.ft.

Annex - Architecture School:
1 Workshop Studio - easy physical and visual access to the maintainence paths and courtyards
   -storage space for above studio
   -upper cat-walk and hoist capability, taller ceiling to accomodate fabrication of full-scale peices
   -movement of existing school wood-shop into new space, with 200% enlargement

2 Electronic Studios
1 Exhibit Gallery in the entry of the building, to accomodate changing exhibits of student work
2 Restrooms, 1 male and 1 female, 300 sq.ft. each
1 Longer Working/Critique Gallery
   -serves as crit. space/ break-out space near studios
2 Staff Offices 120-150 sq.ft. each
Section 6: Design for School of Architecture Annex, Site No. 2

Site

Inner Loop Road

Fondren Library

Anderson Hall
Initial Massing Scheme

160' elongated bar, parallel with existing wings of Anderson Hall, and similar in scale to the 'module' of other campus buildings. The combine massing of the new Anderson Hall would reflect a historic
Section 6: Design for School of Architecture Annex, Site No. 2
What follows is a documentation of Stirlings 1981 addition (in black, below) to an already existing Anderson Hall. Stirling’s addition borrows many of the formal moves of previous additions on campus, specifically those occurring on buildings that envelope the main quad. His solution, a parallel, staggered bar, is one that appears four times (Alan Greenberg’s addition to the Humanities Building at the southwest side of the quad, is still absent in the map below).

Pages 107-114 reveal the precedent inspired moves of Stirling’s addition, as well as similarities that are continued and extrapolated from the original Anderson Hall, to Stirling’s addition, and through the addition planned as part of this final design exercise (Section 6).

Macro-Scale Formal Decisions: Stirling’s addition lies north and west of the original Anderson Hall. Each of the four buildings to the south and north of the central academic quad have extensions beyond the inner bar.

(Greenberg’s addition, to the building at the southwest side of the quad, is not shown as it was not built at the time of Stirling’s addition. It too lies outside the quad, first heading perpendicular to the existing bar, and then running parallel to it.)

Stirling’s addition to Anderson Hall can be described by the operation of five ‘rules’ or considerations, found as well in other additions sited around the quad.

First, each addition is placed outside the quad, in deference to the importance of that space. Next, a strong north-south axis is left open, and additions continue to reinforce existing smaller pedestrian axes. There are as well shape and proportional likenesses between the additions, in height (3 stories) and plan (45°+/- x 160°+/- rectangles).
1- Hierarchy of open spaces: inner loop green spaces chosen as building site - central academic quad left intact

2- Preservation of north-south axis through center of quad

3- Alignment of addition with existing pedestrian path

4- Matching total width of neighboring building to the east,
   - northern boundary: inner loop
   - southern boundary: central academic quad

5- Repetition of elongated bar shape as typified by preceding buildings
Section 6: Design for School of Architecture Annex, Site No. 2

above: Stirling's Addition (shaded)
right: plans, before and after

creation of opposing courtyards/green spaces

interlocking "Ls"

two bars with connecting zone at ends/in-between

continuous run with 90 degree shifts

smooth bar with projections occurring at turns and terminations

succession of connecting smaller spaces
alteration of one end of existing circulation in the process of addition

creation of minor academic courtyard between addition and existing building
Section 6: Design for School of Architecture Annex, Site No. 2

repetition of bar massing

circulation overlaps at 90 degree intersection
-below: a plan for a German school, thought to have inspired Stirling's notion of two conical skylights over the entrances.

circulation as overlook

skylight above central circulation
Section 6: Design for School of Architecture Annex, Site No. 2

axial alignments of windows/doors

glazing at ends of circulation
EXHIBIT WALL BETWEEN INTERIOR AND EXTERIOR

RIDGE

CORNICE

TOP OF WALLS
FIRST FLOOR

BASE

VEERY LARGE BRICKS
STACKED BOND
RUNNING BOND
Section 6: Design for School of Architecture Annex, Site No. 2
Section 6: Design for School of Architecture Annex, Site No. 2
Section 6: Design for School of Architecture Annex, Site No. 2

above: existing second floor plan, Anderson Hall

below: existing first floor plan, Anderson Hall
Section 6: Design for School of Architecture Annex, Site No. 2

above: proposed second floor plan, Anderson Hall

below: proposed first floor plan, Anderson Hall
Section 6: Design for School of Architecture Annex, Site No. 2

[Sketch of a building with labels and annotations]

General: Entrance step raised in rear to interpose new vocabulary.
Continues elements of same materials and horizontal bonding.

Edition: Above

Text: [Details of the building design and annotations, possibly related to material choices and structural considerations.]

Original Building
New Room
Existing Addition
Section 6: Design for School of Architecture Annex, Site No. 2
Section 7: Conclusions

1. Formal 'Grammars' are constructed from a composition or set of designs - they are not discovered, as 'grammar' is not inherent - it is a series of patterns recognized and catalogued by the observer, much like scientific models are descriptions of reality. When devising a formal grammar, one can:
   a. create a rule set as a constraint - allowing in the future only those formal moves that are observed in the set.
   b. allow extrapolations, or exaggerations of formal moves that are visible in the set.
   c. allow interpolations, or an averaging of the formal operations of the set.

2. A formal grammar 'rule-set' can never be fully descriptive of the characteristics of the designs within the set, as there are a finite number of formal situations/circumstances/examples in the set under observation.

3. How does one develop new designs in a given style? How can one write form-grammar rules to guide future development?
   i. enumerate and describe elements/formal decisions governed by the style or form-grammar (catalogue similarities of designs in the set)
   ii. describe all things that are not governed by the style or form-grammar. (catalogue differences of designs in the set) -this is where variation emerges

4. From where does the assumption of a formal grammar arise?
   Very briefly, from the repetition of formal moves. In a word, redundancy. A design that is 'redundant' in its composition is called 'stylistically consistent.' Novelties or breaks in that redundancy diminish the apparent consistency - leading to formal or stylistic ambiguity.

   Extreme degrees of stylistic consistency begin to imply normative rules. (see below)

5. Novelty: the addition of elements (into a composition) not subject to an existing compositional rule. An increase in the number of novel moves also increases stylistic ambiguity.

   governed ○  One rule: filled or vacant
   exempt ○

   ○ two elements governed by style rule, five elements exempt from rule
   ○ ○ (ambiguous)

   ○ six elements governed by style rule, one element exempt from rule

   ○ seven elements, all governed or constrained by a style rule (consistent)

   *notice that 'circularity', size, and proximity of elements are unstated
   2nd, 3rd, and 4th rules...
Section 7: Conclusions

7. Evolution of Thoughts on Style/Formal Grammar:
   a. style as shared attributes
      -Anheim, Rudolf. *The Dynamics of Architectural Form.*
      -Smith, Peter F. *Architecture and the Principles of Harmony.*
   b. product of elements and relationships b/w elements [shape grammar]
      -Knight, T.W. "Transformations in Design: A formal approach to stylistic change and innovation in the visual arts."
      -Koenig H., Eisenberg J. "The Language of the Prairie: FLW’s Prairie Houses."
      -Siny, G. "Generating and Measuring Aesthetic Forms." "What is Design?" "Two exercises in Formal Composition."
   c. product of rules governing a composition process
      -Algorithmic (and aleatory?) design...
   d. product of constraints governing a game
   e. composition is loaded with [necessary/probable/possible/impossible] sites in which articulation [must/can/might/cannot] occur
      -Mr. Potato Head
   f. style as a result of interpolated/extrapolated formal moves, made evident by the observation of sequential variations
      -Dixon, John W. Jr. "Notes Toward a Theory of Style."

8. Boundaries of Styles, Rules, and Form-Grammars.
   [rules are made evident when broken, or solved in a unique manner, or when lineage between seemingly different variants is revealed (or observed)]
   [highlights the boundaries or limits of the rules: to what they do not apply]
   [indicates gaps - possible pathways for variation, stylistic change, extrapolation]

9. What is the relationship b/w this and typology?
   Type: A principle allowing for variation, rather than an a priori set of fixed entities - type operates on the levels of formal configuration, structure, and finally, decorative elements.
   Giulio Carlo Argan, "On the Typology of Architecture"
   Typology - inherent structural and formal order that allows architectural objects to be grouped together, distinguished, and repeated.
   (idead which serves as a rule for the model)
   Rafael Monno
   "idea which serves as a rule for the model"
   Quatremerre de Quincy
   "[asserts] that typology, as an instrument of cultural memory, is a condition of architectural meaning. It is the context in which new work is understood."
   Alan Colquhoun, "Modern Architecture and Historicism" Type as basis for design rationale...
   Ross, Krier

10. Why employ form-grammar in the design process?
    Form-grammar allows for the development of consistently patterned complexity, the contemplation of which is recognized as mentally rewarding in studies of visual and environmental psychology.
    "Psychologists insist that continual exposure to novelty and surprise is essential if mental performance, as measured by tolerance to complexity, is not to decline. Information whose novelty content approaches the limit of tolerance is likely to be the most aesthetically rewarding. If it exceeds that limit, the result will be rejection and ...refusal to adjust to what I would term its mnemonic." (Peter F. Smith)
    Anheim, Rudolf. *The Dynamics of Architectural Form.*
    Hildebrand, Grant. *The Origins of Architectural Pleasure.*

    Apart from providing positive stimuli, stylistic consistency can be used to unify the rhetorical content of a design. Lewalski identifies three basic categories of va that form can address:
    Order- properties of visual elements such as rhythm, repetition, harmony, contrast, etc.
    Function - form can belie the function of a design (1) directly: visual cues for moveable surface, lift-points, etc., or (2) symbolically:
    -streamlining (beyond necessity) to suggest motion, girth (beyond necessity) to suggest stability
    Culture-much more subjective and time-bound notions such as masculinity, organization, nihilism, etc.
    (Lewalski, *Product Aesthetics*)

complexity:
   1) elemental complexity: variety of elements
   2) structural complexity: variety of relationships between the elements

order: the more the parts of a configuration are subordinate to relational properties, the higher its degree of orderliness, or unity.
-order is thus a homogeneity in the type of elements (low elemental complexity), or a subordination of highly varied elements to a limited number of relationships (low structural complexity), or a combination of strong elemental and structural complexity.
Bibliography:


Bibliography (cont’d)


