

The Mystery Case of Undiscovered Patterns

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ABSTRACT

The possibility of patterns begins in Alexander’s first book (1964), *Notes on the Synthesis of Form (Notes)*, with “the idea of the diagrams.” However, patterns as later presented (1977) in *A Pattern Language (APL)* and thereafter commonly understood, differ in important ways from those in *Notes*. This paper discusses those differences in the context of the “self-conscious” and “un-self-conscious” processes discussed in *Notes* and surmises that large bodies of undiscovered patterns await exploration. Why these untouched patterns are potentially critical provides the conclusion to the paper.

THE MYSTERY

The essay has for title ‘the *mystery* case of undiscovered patterns.’ The sleuthing techniques amount to nothing more than re-reading the basic books grown dusty and yellowed from sitting untouched on our shelves too long. The real mystery resides in *why* it takes us so long to question our assumed understanding and go pull out the texts and have a serious second look. The initiating hunch stems from a long standing but unexamined irritability on the part of Sherlock Holmes (aka author West) when his peers exude an admiration for *A Pattern Language* which he does not share. The complementary voice provided by Dr. Watson (aka author Quillien) stems from her growing awareness of wheel-spinning, frequent triviality of patterns, and an exasperating difficulty in moving from patterns to anything close to a pattern *language*. The resulting conversations gave way to an organized review of what is to be understood by ‘pattern’ in *Notes on the Synthesis of Form* (1964) versus *A Pattern Language* (1977). The contrast is not stark black and white and there is even something of a revisionist blurring of the edges when Alexander (1971) writes a Foreword to the paperback edition of *Notes*. However, it dawned on Sherlock and Watson that being aware of the differences offered a heuristic stroke of insight.

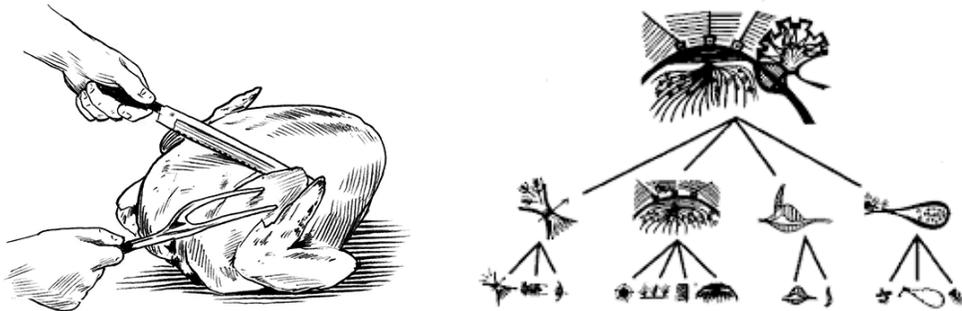
NOTES

A little context never hurts. *Notes on the Synthesis of Form* was the published version of Alexander’s Ph.D. thesis which revolved around the analysis of a rural village in

India. Alexander's father had consented to this 'frivolous' study of architecture if, and only if, the (somewhat artistically inclined) son consented to a more serious discipline first. Mathematics was an agreed upon precursor.

Notes turns out to be a rather Janus-headed text, but the reader can perhaps summon some sympathy with the young man that Alexander was at the time. One line of thought in *Notes*—the mathematical treatment of decomposition—reflects Alexander's training in math and logic. He was out to create a 'science,' indeed a 'mathematics' of design. His use of 'the diagrams' reflected a belief that they were nothing more than visual representations of resolutions of inter-related forces. Now, Dear Reader, how self-conscious of one's 'explicit scientific approach' can you get! The other line of thought shadowed the first with a more philosophical view of the act of design—reflecting Alexander's discomfort with his own attempted formality. Later, *The Timeless Way of Building* (1979) signaled Alexander's bolder moves away from button down thinking and toward a deeper appreciation of the ineffable powers of space and place, as well as the superior results of builders working un-self-consciously without all this ego and scientific falderal.

NATURAL NOT ARTIFICIAL WORLDS



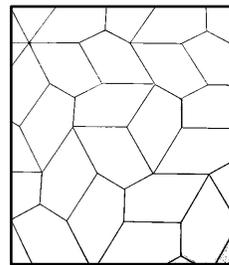
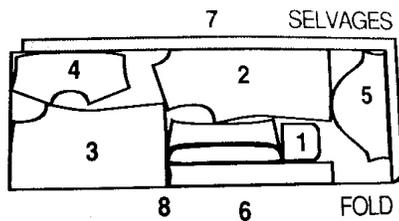
The easiest handle on *Notes*, is that Alexander essentially recapitulates Plato:

“First, the taking in of scattered particulars under one Idea so that everyone understands what is being talked about one...Second, the separation of the Idea into parts, by dividing it at the joints, as nature directs, not breaking any limb in half as a bad carver might... I love these processes of division and bringing together, and if I think any other man is able to see things that can naturally be collected into one and divided into many, him I will follow as if he were a god.”

Plato, *Phaedrus*, 265BC

For both Plato and Alexander (in *Notes*), it is the '**natural world**' that is observed, the '**natural joints**' that are discerned, and the (mostly) isolated subsystems or elements, that are identified as classes, patterns, or diagrams. The systems – in terms of inter-related elements – are not homogenous; there are clusters of forces with denser interactions among themselves than with other forces seen in the system. The 'natural

Digging now just a bit deeper still and introducing a thread we want to continue throughout the essay, a study by Jean Lave and Etienne Wenger on situated learning demonstrates that our general ability to discover problems and apply solutions depends upon where, on that spectrum, our system under investigation is located. Staying with our textile example, Moroccan tailors skilled at laying out patterns on a bolt of cloth in such a way as to minimized waste, had difficulty grasping the theory of tiling (a mathematical system) of which their work is an instance. In this same study, students acing a formal test on comparative fractions at school crossed the street to the corner drug store and were unable to figure out whether the 64 ounce cola at price X was a better deal than the 28 ounce at price Y. At its simplest, situated learning is learning that takes place in the same context in which it is applied. The argument is that learning should not be viewed as simply the transmission of abstract and decontextualized knowledge from one individual to another, but as a social process whereby knowledge is co-constructed and embedded within a particular social and physical environment.



FITNESS AND COMPOSABILITY

The naturalness or artificiality of a system also affect the fitness and composability of the patterns we perceive. As pattern workers we are keenly interested in these qualities and they are essential qualities for diagrams/patterns as discussed in *Notes*.

Fitness has two aspects, first as a resolution of the forces involved and second, as an optimal resolution within the context. Given any set of forces there will be a number of ways in which those forces can be resolved. However, to get from ‘any old solution’ to ‘optimal’ is a very real problem. The secret will reside in the situatedness or naturalness of the context and the un-self-conscious process (more anon).

As for composability, Alexander asserts in *Notes* that diagrams (patterns) should be unique, independent, and composable. By composability he meant that you should be able to combine the primary subsystems and any of their contained elements (each represented as its own diagram/pattern) to create different, but equally functional systems, which themselves should be useable as an element of larger systems.

Now, important point for many of our readers, if you are working with an artificial system, it is unlikely that any patterns you find will have the property of

composability. This is because the forces they resolve, and the manner in which those forces are resolved, are consequences of the formal (artificial) theory behind the system. The most obvious example is programming where the goal of writing reusable (composable) blocks of code – collections of which comprise code libraries – is seldom, if ever, realized. Some readers might remember the multiple companies selling libraries for C or Pascal and remember the failures arising from the fact that each library was based on its own assumptions, style, and compiler. Embedded in each and every block of code are assumptions about the theory of computer language and of programming along with idiosyncratic decisions about coding style – making them unusable absent the mind set and theories of the original programmer.

The software community has long been enamored of the idea of reusability – of composability. Object-orientation was supposed to provide reuse via class libraries – hiding the code that tripped up C libraries behind each object’s message protocol. Unfortunately, reuse – even pattern reuse – is still elusive and probably for the same reasons. First, reuse would require seeing and understanding the world ‘as it is’ without the theoretical preconceptions of how it ‘should’ be. Second, you would need to be able to decompose that complex and vast system into subsystems where you can see and enumerate the elements and relationships among them. This would require taking the world apart at its ‘natural disjunctions’ à la Plato and Alexander in *Notes*.

PATTERN MINING

“... the idea that you can create abstract patterns by studying the implication of a limited set of forces, and can create new forms by free combination of these patterns. . .[is] the central idea this book is all about.”

Preface to the Paperback edition of *Notes*

The underlining of studying is a Sherlock emphasis to differentiate (Janus-headed style) between ‘groking’ and analyzing. In his study of the Indian village, Alexander groks 141 forces in thirteen categories, e.g. caste, employment, and agriculture, determines which forces interact in such a way as to form clusters (he finds 4 subsystems and 13 sub-subsystems) each of which is then depicted with a diagram and a narrative. Consider this example on cattle, where the narrative seems to be straightforward but the diagram (this one and many others) and how it was arrived continues to mystify both Sherlock and Watson!

:



... the sacredness of cattle (7) tends to make people unwilling to control them, so they wander everywhere eating and destroying crops, unless they are carefully controlled. Similarly the need to upgrade cattle (53) calls for control that keeps cows out of contact with roaming scrub bulls; and further calls for some kind of center where a pedigree bull might be kept (even if only for visits); and a center where scrub bulls can be castrated. Cattle diseases (57) are mainly transferred from foot to

foot, through the dirt — this can be prevented if the cattle regularly pass through a hoof bath of disinfecting permanganate.

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If the groking is successful the resulting diagrams (patterns) will be composable and exhibit ‘fit’ i.e., be both elegant and enduring — qualities later subsumed under the umbrella label QWAN.

THE UN-SELF-CONSCIOUS PROCESS

Happily, Alexander provides the novice pattern miner with a hint. Yes! It’s the un-self-conscious process. We start at the very beginning.

Alexander believes that the operation of a natural system automatically gives rise to the clustering and resolution of forces. Goodness of fit is defined by the absence of bad fit. The process by which this occurs can be lengthy — spanning multiple generations of human beings — and often occurs in a rather unarticulated sort of way. Bad fits are resolved by happenstance and improved piecemeal by trial and error until an enduring and appropriate stability is achieved and there is no longer any impetus for ‘tweaking.’ Reaching goodness of fit requires empowerment at the local level. [Any reader who has rented a place, suffered the constant annoyance of an obviously misfit that the landlord both refuses to address and forbids the renter to address, might begin here to viscerally feel what is at stake.]

Let us again dig deep down a bit since it matters. Alexander distinguishes between simple cultures and our own. In simple ‘un-self-conscious’ societies, kinship plays an important role in social structures, urban environments figure less prominently, individuals shoulder higher levels of responsibility, there exists a widespread understanding of crafts and a concomitant lack of professions such as ‘architecture.’ Little attention is dedicated to design; there is instead a right way and a wrong way. Design is governed by habit.

The point here is not to wax poetic about the noble savage—and Heaven knows, the ancient Vedic traditions of the Indian subcontinent are utterly sophisticated when it comes to epistemology, logic and math. The point is to observe the superiority of un-self-conscious procedures. Three such points of superiority: learning, self-organization, identification of forces.

Consider learning. In un-self-conscious cultures learning occurs through an apprenticeship model capable of conveying thick, rich, contextual, subtle understandings (i.e. situated learning) which contrast with the more formal methods of self-conscious cultures which limit content to thin facts and figures. Michael Polyani in his work on tacit information compelling told us that we might self-consciously force feed a great deal of biology or chemistry to our students but to have them assimilate how scientists actually work requires significant exposure to a community of practitioners actually engaged in their practice. Japan’s management guru Ikujiro

Nonaka compelling demonstrates the great difficulty of extracting subtle tacit knowledge from workers who have their hands in the ‘real’ and making it explicitly available to management. Our business schools continue to graduate MBAs who have never held a job but boast of their bellies full of power point lessons who, as the expression goes, ‘know everything and understand nothing.’

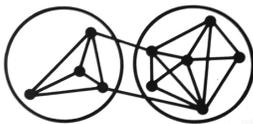
Alexander speaks here of builders:

“... building skills are learned informally, without the help of formulated rules. However, although there are no formal rules, the unspoken rules are of great complexity, and are rigidly maintained. There is a way to do things, a way not to do them. There is a firmly set tradition ... in the wealth of myth and legend attached to building habits.”

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Each myth, tradition, ritual, and taboo that we find, in any domain of interest, points to an enduring, stable, cluster of resolved forces — each of which exhibits good “fit,” lest they would have survived long enough to be mythologized. A body of myth and tradition comprises a rich vein of ‘pattern lore’ that should be mined as ‘pattern ore.’

Consider self-organization. According to Alexander the un-self-conscious process has a structure that makes it homeostatic (self-organizing), and it therefore consistently produces well fitting forms, even in the face of change. Alexander uses a binary description of the goodness of fit between a form and a context as a way of exploring form-making in un-self-conscious and self-conscious cultures. Imagine (this is from page 39 of *Notes*) a system of one hundred lights where ON represents a misfit and OFF represents good fit. Lights can be connected to other lights and any light has a 50-50 chance of turning itself OFF in the next second. The likelihood that a light that is OFF will turn itself ON is positively correlated to the number of lights that it is connected to that are ON. Once all lights are OFF only an outside force can turn a light ON. This system is related to the form-making process in that a given misfit (light ON) can either be resolved (turned OFF) or not (kept ON) over some period of time and that a given misfit (light ON) may cause a condition of good fit (light that is OFF) to become a misfit (light ON). The state of good fit is represented by the condition of all lights OFF.



Got that? Now Alexander looks at two extremes first. When there are no connections between lights it takes little time for all the lights to go OFF; when there are rich interconnections it takes a long time. Next he examines a system with subsystems having many internal connections but few connections between them. This configuration takes a reasonable time to reach all lights OFF. Alexander concludes that adaptation in a reasonable amount of time requires proceeding subsystem by subsystem, each subsystem relatively independent of the others. [Dear Reader, you can conduct a similar experiment. Place 100 pennies on a big piece of cardboard (metaphorically somewhat like the self-conscious architect-developer with his blueprint of a new sub-division) and count the number of times you have to flip the

cardboard to get all of them to land on Heads on one throw. Then, for contrast, see how long it takes you by flipping the individual pennies (sub-systems) one at a time.]

Consider the identification of forces. A form adapts to its context through the demands that has called it into being. As with the light bulbs or pennies, an adaptive process proceeds piecemeal. It is for this reason that forms from un-self-conscious cultures, molded not by designers but by the slow honing through trial and error within tradition, are so beautifully organized and adapted. When the designer (in our own self-conscious culture) is called on to create a form adapted to its context he fails: the preconceived categories out of which he builds his picture of the problem do not correspond to the inherent components of the problem, and therefore lead only to the arbitrariness and willfulness.

In other words, many forces in any artificial system will arise, solely and exclusively, from *premises*. Le Courbusier, for example, was operating from his personal *premises* about how he thought people should live, not forces emanating from any sort of natural system. If we turn to the software community, we might again take the design patterns in the Gang of Four book. Programming, even object-oriented programming is clearly an artificial system. Even more artificial is any given programming language. Perhaps 4 or 5 of the 23 patterns in the Gang of Four book address forces common to programming while the others resolve forces present only because of the constraints and assumptions arising from the C++ programming language.

To further explicate this idea, consider the intent of Bjorn Stroustrup when creating C++. The intent was to create a language that imposed “discipline” on C language programmers without impairing the efficiency (speed and economy of expression) of the underlying C language. C itself was *premised* on being as direct a representation of machine hardware as possible. The notion of ‘discipline’ was *premised* on a theory of program architecture and stylistic convention. These *premises* led to the creation of forces like explicit memory management (allocate and de-allocate memory as needed), memory leaks (forgetting to de-allocate), typing, type conversion, etc., which led directly to patterns like FACTORY and ABSTRACT FACTORY which presume the entire C++ *premise* in order to be useful.

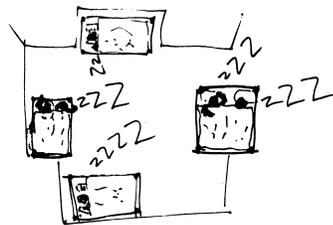
A PATTERN LANGUAGE (APL)

Again, just a touch of context. *APL* was not, as was *Notes*, a solitary endeavor but that of a group. The impetus was grant funding, a Request for Proposal that Alexander and his team answered. As is true with any grant, certain restrictions and expectations as to outcomes and deliverables were imposed. The National Institutes of Mental Health wanted to know what, if any, relationship there was between well-being and the built environment [ah! those glorious days when the American government put money into such endeavors]. These constraints are important to consider, but relatively minor in comparison to other decisions that shaped *APL*.

First consider scope. In *Notes* the focus was on one rural village; in *APL* it was the entire built environment from nation-state to fireplace mantel. Scope alone dictated that the approach used in *Notes* was impossible: the enumeration of forces (from 141 to thousands), the observation of interactions (potentially exponential to the number of forces), the observation of naturally occurring clusters (hundreds of thousands), and depiction of each cluster with a half-page narrative and line-art diagram.

Second, instead of groking the *depths* of one *natural/mixed* system such as a rural village in India, *APL* shifts attention to the modern environment which is mixed/*artificial*. Looking *horizontally*, similar sets of forces, resolved more or less in the same manner across several instances, replaced the *Notes* style “clusters.” A pattern became, *de facto*, the abstraction of commonalities *across instances* presented with sufficient interpretive context to allow for variations on a theme.

In order to illustrate this second point we turn to pattern 186 COMMUNAL SLEEPING where the team obviously struggled mightily with natural versus self-conscious world. [Should you, Dear Reader, crack a smile, well, so be it.] The diagram of forces as shown. The text reads:



beds within sight and sound of other beds

In many traditional and primitive cultures, sleep is a communal activity without the sexual overtones it has in the West today. We believe that it may be a vital social function, which plays a role as fundamental and as necessary to people as communal eating. . . .(the discussion continues) . . . Of course, it is a beautifully intimate thing□ the moment in the morning and at night when a couple are together, in private, failing asleep or waking up together. But we believe that it is also possible to create a situation where, occasionally, people can sleep together in big, family-size groups. . . This pattern may seem strange at first, but when our typist read it, she was fascinated and decided to try it one Saturday night with her family. They spread a big mat across the living room. They all got up together and helped the youngest son on his paper route; then they had some breakfast. The Editor asked: Are they still doing it? The Authors replied, “No, after two weeks they were arrested. . .

Third, Alexander and his team, were guided by theory — a self-conscious process. Just the kind of academic theory that was decried in *Notes*.

“... with architecture once established as a discipline, and the individual architect established, entire institutions are soon devoted exclusively to the study and development of design. The academies are formed. As the academies develop,

the unformulated precepts give way to clearly formulated concepts whose very formulation invites criticism and debate. ... With the teachable discipline called “architecture,” the old process of making form was adulterated and its chances of success destroyed.”

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Because a self-conscious process supported *APL*, the resulting patterns had only a coincidental likelihood of exhibiting fit (or QWAN) or composability.

“My contention is this. These concepts will not help the designer in finding a well-adapted solution unless they happen to correspond to the [natural] system’s subsystems. But since the concepts are on the whole the result of arbitrary historical accidents, there is no reason to expect that they will in fact correspond to those subsystems.”

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LANGUAGE RATHER THAN COMPOSABILITY

With *APL*, and its lack of diagram equivalents (both the photographs and the sketches in *APL* are evocative illustrations of the text, not diagrams in the sense of *Notes*), Alexander proposes the notion of ‘language.’

In the introductory pages of *APL* Alexander speaks eloquently of the possibility of ‘poetry’ of space through densely overlapping patterns rather than straight and simpleminded ‘prose,’ but, basically, the reader is left hanging high and dry. How does the language actually work? Are the patterns to be semantic units like vocabulary words? Is there a grammar and what would the syntax be?

At this point in the Sherlock/Watson conversations, Sherlock was snickering and Watson mournfully reflecting on the obvious: in spite of tremendous layman support for *APL*, the do-it-yourselfers were not building anything close to QWAN. Results, at best, were ‘cozy’ and, more frequently, ‘funky.’ It was also true that most of the descriptions of the participative process (where Alexander and his team designed *with* the end-users) tended to be romantically ‘doctored.’ In actuality, as professional architects they listened to their clients and then went off and did the design work themselves. To salvage the constructive nature of this investigative essay, Watson stepped outside of the agreed upon compare and contrast between *Notes* and *APL* and called for help in the form of Nikos Salingaros. Unlike Sherlock, Salingaros is a bonafide mathematician and, also unlike Sherlock, a fan of *APL*. Salingaros certainly admits that *APL* is sorely lacking in procedural clues, but he jumps into the breach with some very helpful comments. The interested reader should consult the Salingaros website, but his take on how the language works runs roughly as follows:

APL is not a design method, however, a set of connected patterns can provide a framework upon which a design can be anchored. The patterns help limit design choices to those that genuinely support well-being.

The goal, when working out a pattern language, is to cluster patterns into groups of about five or fewer on each level of scale. Pick those patterns that are most relevant to the problem at hand, then choose not more than a dozen related patterns. Identify a vertical dimension (e.g., time, space, or group size) appropriate to the process and study how the generative process develops as one moves up the levels of scale. As in any living complex adaptive system the lower levels determine emergent new rules and patterns at the next level up, not vice versa. As an example here, is a short language of connected patterns about urban space (Salingaros suggests starting with the small scale since it will be more intuitively meaningful to end users):

GALLERY SURROUND proposes that people should be able to walk through a connecting zone such as a balcony to feel connected to the outside world. OPENING TO THE STREET is the corollary: people on a sidewalk should feel connected to functions inside a building, made possible by direct openings. BUILDING EDGE should be such as to encourage life, creating pedestrian nodes and the necessarily crinkly, crenelated geometry that they require. ACTIVITY POCKETS reveal that any public space is successful only if its edge contains and accommodates successful pedestrian nodes. BUILDING FRONTS define the life at the built edge of a street, while uniform set-backs "almost always destroy the value of the open areas between the buildings." PATH SHAPE requires pedestrian nodes along a path, and these will deform any straight edges into a more fractal form. ARCADES connect the inside of buildings with the world outside via an intermediate partially-enclosed space; without them, the transition is too abrupt. CONNECTED BUILDINGS create both a boundary and a path along it, which is destroyed by having intermediate space between the buildings. MAIN GATEWAYS give significance -- by defining access -- to what would otherwise be a useless space between buildings. INDUSTRIAL RIBBON functions as one possible way to create a wide boundary for separating regions containing other types of buildings. Finally, the two patterns NEIGHBORHOOD BOUNDARY and SUBCULTURE BOUNDARY stress the necessity of containment in a living city, and show how one zone can destroy an adjoining zone if the appropriate boundaries are absent. Together, the above patterns combine to create the picture of a living city that depends in large part on its convoluted, permeable interfaces.

Salingaros teases out unwritten but implicit connective rules showing how two different aspects of a pattern come into play. On one hand, a pattern's internal components will determine its inclusion into a larger pattern. On the other hand, it is the interface that determines overlap, or connection on the same level. Two patterns on the same level may compete, loosely coexist, or necessarily complement of each other. Basic relationships include:

- One pattern contains or generalizes another smaller-scale pattern.

- Two patterns are complementary and one needs the other for completeness.

- Two patterns solve different problems that overlap/coexist on the same level.

- Two patterns solve the same problem in alternative, equally valid ways.

- Distinct patterns share a similar structure, implying a higher-level connection.

One of the principal methods of both constructing and validating a language is that every pattern be connected vertically to patterns on both higher and lower levels. Removing one pattern without understanding its connections damages a significant portion of the language because it also removes at least one vertical chain. If a vertical relation is one of inclusion, then obviously those patterns below are also eliminated. In addition, all linked patterns above the eliminated pattern will not work as intended.

A brief aside is in order here. In *Notes* Alexander did attempt to create a kind of formal graph, with nodes and edges, to depict clusters of interacting forces. These graphs are not the diagrams he equates to patterns. The ‘diagrams’ that were ‘patterns’ are the illustrative figures, purely artistic, purely a gestalt expression of what was in Alexander’s head, of the elements of the Indian village.

In a paper, “A City is Not a Tree,” Alexander specifically argues against the view that a complex system, like a city, can be reduced to some kind of formal hierarchical acyclic graph — like a decision tree. In *APL*, the mention of poetry aside, Alexander seems to be suggesting that a pattern language would have a grammatical structure. Salingaros’ explanation of a pattern language also carries this same sense – a constraint grammar that can be parsed, somewhat akin to the old “sentence diagramming” exercises in English grade schools. It is an open question for the reader, Sherlock and Watson see only another inconsistency in how Alexander describes his intent.

LINE UP

Since the focus of this essay is on the differences of how ‘patterns’ are understood, a compare and contrast table provides a helpful summary.

<i>APL</i> (COMMON UNDERSTANDING) (research on a mixed/artificial system)	<i>NOTES</i> (research on a mixed/natural system)
DEFINITION: A pattern is a solution to a recurring problem.	DEFINITION “... a diagram is ... an abstract pattern of physical relationships which resolves a small system of interacting and conflicting forces, and is independent of all other forces and all other possible diagrams.” A pattern is the way the forces in the denser clusters of a natural system interact in order to maintain internal stability and semi-autonomy.
Focus on the problem and its solution with the context being secondary	Focus on ‘naturally’ occurring subsystems at equilibrium within a context
Patterns abstracted from constructed	Patterns abstracted from natural world

world	
The potential is for ‘languages’	The potential is for simple composition at levels of scale
The pattern language will assure QWAN [but Alexander’s own rules would make composability dubious.]	The form and fit of patterns will be elegant and enduring (i.e. demonstrate QWAN). The process is one of honing by many people over time.
Horizontal. Pattern mining works by culling commonalities across solutions and abstracting the forces and patterns by ignoring the context.	Vertical. Pattern mining works through parsing the ‘natural disjunctions’ and identifying dense clusters within a specific context. Each cluster is the basis for a potential pattern.

Of course, as mentioned in the introductory paragraph, there is a lumpy clumsy spectrum of self-conscious and un-self-conscious activity rather than a sharp dichotomy or smooth flowing gradient. There is also blurring, some of which comes from Alexander himself who never outgrows his Janus-headedness and who occasionally tries to soften his tracks in retrospectives. Consider two short excerpts from the Foreword to the paperback version of *Notes*:

“Today, almost ten years after I wrote this book, one idea stands out clearly for me as the most important in the book: the idea of the diagrams. These diagrams, which in my more recent work, I have been calling patterns, are the key to the process of creating form.”

“...so many readers have focused on the method which leads to the creation of the diagrams, not on the diagrams themselves ... I am very sorry that this has happened ... no one will become a better designer by blindly following method ...

What Sherlock and Watson want to do in this investigation is *highlight* differences and pull out heuristic avenues of inquiry: method, mining, context, consciousness.

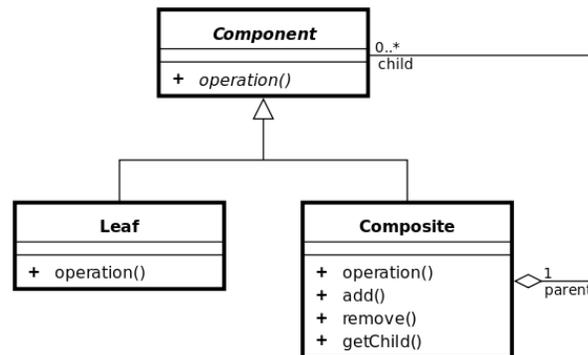
Method and Mining. Much of *Notes* focused on a ‘method’ (essentially set theory) entirely consistent with Alexander’s early desire to establish a science of design. And yet, turning the Janus head in the other direction, there is also the idea that designers can ‘grok’ an understanding to support the discernment of systems, subsystems, and relationships. The means of discovery is *not* method, not reducible to formula. In both cases, patterns are not authored but, as it were, unearthed. Once mined, observations can be captured as abstractions; visualizations like the diagrams in *Notes*, or formatted prose as in *APL*. Optimally, we need to move beyond the Janus-headed shifting of *either/or* toward the Platonic (or Zen) *both/and*.

Context and Consciousness. *Notes* operated from inside a given and more or less natural context. Within such naturally occurring systems we can tease out forces of stability and semi-autonomy, i.e., patterns, but this is all in relation to the surrounding context. *APL*, on the other hand, floats more loosely across vast expanses and

therefore is perhaps more prone to superficiality. Un-self-conscious waters run deeper and are far more fecund. In that sense *Notes* is the more inspiring of the two texts. We turn our attention in that direction.

SO WHAT'S THE BIG DEAL?

When the Hillside Group formed to explore the works of Alexander, the focus was on *APL*. Something can be said for the appropriateness of this choice. *APL* was a good match for the world of software (especially programming) as the software community is concerned, almost exclusively, with artificial systems.



However, a boat was missed; a rather critical one considering the first book of software patterns had the title: (emphasis is Sherlock's) *Design Patterns: Elements of Reusable Object-Oriented Software*. Only the “diagrams/patterns” described and discussed in *Notes* have the aspect of composability — the ability to put them together in novel ways to create novel systems. Instead of “reusable” and “object-oriented,” the APL based approach results only in patterns of algorithm and data structure design for C++.

APL is *not*, however, the best model as attention shifts away from artificial systems to mixed systems. And this shift was noticeable almost from the beginning of the patterns movement—with the first PLoP conference including papers on organizational patterns, pedagogical patterns and others.

For these domains, Sherlock and Watson recommend a return to the origin of the pattern idea as developed in *Notes*. We would go as far as asserting that the ultimate success of developing pattern languages useful for educational, social control, and organizational systems depends on doing so. The *Notes* approach will lead to discovery of overlooked and more profound systems and subsystems, different sets of forces, different clusters, and composable patterns. We conclude with a discussion of the socialization/education realm.

SOCIALIZATION/EDUCATION

Consider three subsystems: *Enculturation* or the learning/teaching of the tacit knowledge that enables one to be a member of a culture; *social replication* or the transmission of knowledge, explicit and tacit, required to reproduce the social roles, including job roles required for society to function; and, *knowledge transmission and extension*, the most widely acknowledged function of public education systems in ‘our cultures.’

Enculturation deals with forces like memory, motivation, psychological desire, and wanting to blend in. It yields clusters with pattern names like: MOTHER’S KNEE, MONSTER UNDER THE BED, FAIRY TALES, FOLLOW THE SCRIPT, SELF-IMPROVEMENT 101, and GOOD GIRLS DON’T.

Social replication might yield patterns like: FAMILY TRADITION, IN YOUR FATHER’S FOOTSTEPS, STAY-AT-HOME MOM, WAGE SLAVE, YOUR VOTE COUNTS, and HORATIO ALGER.

Knowledge transmission and extension systems tend to be very artificial in nature and many of the forces that are identified and resolved are not natural, for example, 30 kids to a classroom, the politics of Evolution or Creationism, fifty-minute class, etc. This means that patterns based on the resolution of those forces will lack true significance and composability.

Reconnecting learning to the context where it can be naturally used is the antidote. Situated learning within natural occurring systems (craftsmen such as Moroccan tailors, scientific inquiry, or hands-on blue collar workers within specific industries), as Jean Lave, Michael Polyani, and Ikujiro Nonaka all point out, give us phenomena worthy of attention. It is here that domain expertise truly takes hold, sinking deep into the tacit world of the un-self-consciousness. It is here that we find an abundance of myth, tradition, ritual and taboo that point both to natural forces needing resolution and the naturally occurring clusters where they are resolved. Pattern lore. Pattern ore. Vertical parsing not horizontal culling is the way to go.

Our own un-self-consciousness can also provide a pathway. As one concrete example of such mining we offer this excerpt from Alfred North Whitehead’s *Modes of Thought* (1938) who reflects on the natural world of human nature and cognition, education and the creation of schools.

In this lecture, the dominant topic is expression. Accordingly, we now pass to the outstanding example of the way in which mankind has fabricated its manageable connections with the world into a means of expression. Language is the triumph of human ingenuity, surpassing even the intricacies of modern technology. It tells of widespread intelligence, sustained throughout scores of thousands of years. It is interesting that from the alternatives, sight and sound, sound was the medium first developed. There might have been a language of gesticulation, Indeed, there is a trace of it. But the weak point of gesticulation is that one cannot do much else while indulging in it. The advantage of sound is that the limbs are left free while we produce it.

But there is a deeper reason for the unconscious recourse to sound production. Hands and arms constitute the more unnecessary parts of the body. We can do without them. They do not excite the intimacies of bodily experience. Whereas in the production of sound, the lungs, and throat are brought into play. So that in speech, while a superficial, manageable expression is diffused, yet the sense of the vague intimacies of organic existence is also excited. Thus voice-produced sound is a natural symbol for the deep experiences of organic existence.

This sense of reality is of great importance for the effectiveness of symbolism. Personal interviews carry more weight than gramophone records. What an economy could be achieved if the faculties of colleges could be replaced by fifty gramophones and a few thousand records! Indeed, we might have expected that in the sixteenth century printed books would have replaced universities. On the contrary, the sixteenth and seventeenth centuries were an active period in the development of educational foundations. The sense of reality can never be adequately sustained amidst mere sense, either of sound or sight. The connexity of existence is the essence of understanding.

Alfred Whitehead

Connexity and cross modal perception, as Whitehead points out, are clusters truly grounded, deeply rooted, in natural human cognition and hence worthy of the educator's attention.

Sherlock and Watson close their case: they had simply lost sight of some of the earlier lessons from *Notes*. The ultimate object of design is form and, just as iron fillings follow the underlying magnetic forces, we don't want to separate formal manifestations from the underlying processes which produce the form, as both are observable aspects of the same field.

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