Broadening the Horizon of Language Study: Analyzing Architecture as Visual Language

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Abstract: Architecture is to building as literature is to the printed word. In other words, architecture is a visual means of human expression — a socio-cultural language in visual form (Gandelsonas 1973, Jencks and Baird 1997). In broad strokes, language is the expression of human thought, and all thought is expressed through language — hence, all knowledge of the universe may fall within the scope of language study (Derrida 1976). However, language study often adopts a completely mechanistic conception of language, with a focus on the empirical analysis of observable linguistic data -- concentrating on the form rather than the content. As a result, culture and systems of meaning remain pushed towards the periphery of the concern of linguistics and language study. As the study of any system of expression involves the study of meaning, it requires a more qualitative than a mechanistic approach. Language study must therefore seek to embrace both measurable physical events and the immeasurable psychological events that prompt the physical. This paper explores one of the most ubiquitous yet overlooked constructs of socio-cultural meaning — architecture, in an attempt to broaden the horizon of language study. It utilizes the framework of pattern languages (Alexander 1975, 1979; Alexander and Ishikiawa et al 1977)) to explore the elements and rules that govern the grammaticality of the visual language of architecture in constructing sociocultural meaning, drawing analogies with natural language. With the exposition of the sociocultural language of architecture as analogous to natural language, it sets up a premise for further future work in transposing a superlinguistic analysis of architecture as visual language.

Keywords: language study, visual language, architecture, pattern language, sociocultural meaning systems, semiotics, superlinguistics

1. Introduction

Humans are culturally habituated beings that are never completely free of projecting enculturated understandings in any language-culture

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situations (Alford 1981). Often language study relies on a completely mechanistic conception of language with a focus on the empirical analysis of observable linguistic data, concentrating on the form rather than the content. As a result, language analysis suffers severe reduction in the overlapping inquiries into language and its inseparable adjunct — culture. Although the speech act itself is a physiological and acoustical phenomenon, the underlying psychological properties are what make it language — more than a mere physical event (Derrida 1976). Language study must therefore seek to embrace both measurable physical events and the immeasurable psychological events that prompt the physical. As Malkiel (1959) points out, language study can be oriented to 'a fuller, less schematic grasp of the facts of language in all its dimensions and layers, nuclear and peripheral alike, embedded in the broader facts of culture.'

In a broader perspective, language is the expression of human thought, and all thought is expressed through language, hence all knowledge of the universe may fall within the scope of language study (Fromkin et al 2018). Language study, hence, is in need of an approach to language that is Janus-faced: consciousness interpreting the interrelationship of meaning and form, of synchrony and diachrony, of relativity and universals, of symbols and signs, of communication and speech, of philosophy and science; a complimentary yes-yes approach to seeing oppositions which are inherently interrelated (Kieth 1991).

One of the greatest means of social as well as visual expression, and one that goes considerably unnoticed, especially in the realm of language study is architecture — the visual language of society. Architecture embeds, embodies and reflects the culture of a society (Bonta 1980; Jencks 1977). It reflects the rapid changes that take place in a society and its culture; for example: the ubiquitous glass box shopping malls to ancient ruins dating back to thousands of years transcending time and culture. Thus people not only incorporate such change into their world, they mould the shape of their world in accordance and begin to live within their perceptions (Jencks 1977). Architecture has thus been society's language (Grafik 1998). Therefore, analyzing this visual language can prove valuable insights into the elements of a society.

This paper attempts to posit the patterns formulated in architecture as a semblance of grammar and explore the analogous structure between architecture and language. Both language and architecture have finite elements that can be recombined in infinite combinations to create patterns for meaning — infinite diversity in infinite combinations symbolizing the elements that create truth and beauty. In order to understand the structure of architecture as visual language we adopt concept of a pattern language as postulated in Alexander (1975, 1979) and Alexander et al (1977), and present its analogy to natural language, therefore setting up the premise for a superlinguistic analysis of architecture using the formal tools of linguistics. In this paper we only explore the pattern language component and propose a future superlinguistic analysis given the premise of architecture as visual language.

The paper is structured as follows: with an introduction in section §1, section §2 defines form and meaning in architecture and its social communicability, section §3 describes the framework of pattern languages as a means of analyzing architecture as visual language, with a detailed exploration of analogies with natural languages and grammaticality (§4), section §5 focuses on the possibility of future work in the form of a superlinguistic analysis, and section §6 summarizes the paper with concluding remarks.

2. Form and Meaning in Architecture

Quoting Vitruvius, a 1st-century BC Roman, the English poet Sir Henry Wotton stated in his charming dictum: "Well building hath three conditions: Commoditie, Firmenes, and Delight." More prosaically, it can be said that architecture must satisfy its intended uses, must be technically sound, and must convey aesthetic meaning (Nuttgens 1997). Thus architecture comprises a base level — the technology used in constructing the form, and a deeper level comprising aesthetics and meaning – we can consider these the surface structure and the deep structure of the visual language of architecture.

2.1 Surface Structure: Form

On the very base level architecture includes the technology employed. Architectural form is inevitably influenced by the technologies applied, but building technology is conservative and knowledge about it is

cumulative (Nesbitt ed.1996). For example, precast concrete has not rendered brick architecture obsolete. Thus innovation is additive rather than replacive in that although design and construction have become highly sophisticated and are often computerized, this complex apparatus rests upon the shoulders of pre-industrial traditions inherited from millennia during which most structures were lived in by the people who built them (Nuttgens 1997). The technical demands on building, however, remain the elemental ones — to exclude enemies, to circumvent gravity, and to avoid discomforts caused by an excess of heat or cold or by the intrusion of rain, wind, or vermin.

2.2 Deep Structure: Meaning

Beyond the base level, architecture comprises aesthetics and the level meaning — creating aesthetic structures with meaning that is socially communicable.

2.2.1 The Level of Aesthetics

On the next level, architecture pertains to aesthetic meaning. The aesthetic response to architecture is more complex. It involves all the issues already mentioned, as well as other, more abstract qualities. An experience of architectural space is personal and psychological; it differs from that of sculpture or painting because the observer is not merely viewing it but happens to be *inside* it (Nuttgens 1997). It is affected by associations the observer may have with the materials used and the way they have been assembled, as well as such aspects as the lighting conditions, ventilation along with key elements such as proportion — the relation of various dimensions to one another and their relation to human scale. Structural logic may or may not be dramatized. Elements such as windows, their scale and rhythm, affect the observer, as do the interplay of geometrical form and the way space is articulated. Movement through a sequence of spaces has narrative force; no single point of view is adequately descriptive. The recurrence of thematic forms, appearing in varied guises and contexts, contributes to unity and creates feelings — relaxation and protection or stimulation and awe (Jencks and Baird 1997).

2.2.3 The Level of Meaning

The level of aesthetics has a further, deeper level — the level of meaning, whereby architecture is communicable in that it embeds and

reflects a plethora of complex issues and abstract qualities. This dimension of architecture is attested by some of the finest structures or products of architecture that are often so well constructed that they are imbued with a continuity which transcends its original purpose (Jencks 1977). These products then continue to exist not only as beautiful objects, but as documents of the history of cultures, achievements in architecture that testify to the nature of the society that produced them — as visual expressions of the society. These achievements are never wholly the work of individuals: architecture is a social product (Jencks and Baird 1997).

2.2.4 The Social Communicability of Architectural Meaning

The work of architecture is socially communicable in that each product is minimally reflective of the place and the climate (through tectonics), the people and their way of life (through materials and elements), the people and their way of thinking — their beliefs, hopes, aspirations and philosophies (through craftsmanship). Architecture thus involves people, cultures, society, heritage, beliefs, memories, history — a way of life. It transcends beyond the realm of the physical to represent that which is abstract and perhaps even the timeless (Nuttgens 1997). For example, if we consider the Taj Mahal, we find that it represents the history of a society and culture, their craftsmanship, their beliefs, their perceived aesthetics, but most importantly, it represents the undying love of a man for his beloved wife. Architecture can thus communicate intangible concepts through the tangible. It can shape, it can define, it can morph, it can change – it can breathe life into space. It creates something where nothing was and yet make it seem as though it was always there (Wurman ed. 1986). Architects believe that this transcendental power of naturalization of a built-form to its place and people can be achieved only because architecture can convey meaning in basic socially communicative terms (Jencks 1977; Alexander 1979); in other words, it can speak to the people — a means of expression that carries meaning, has rules of order and above all is generative thereby constituting a code that communicates socially — a system of signs akin to that which we call 'language'.

Most architects have philosophized architecture as a language resorting to such analogous expressions as 'the semantics of a structure' or 'the syntax of space' or simply 'the poetry of a building'. Although analogies between language and architecture can be detected in scattered form in

most books of architectural theory on meaning and aesthetics, a comprehensive account of this analogy can be found in Alexander's (1975, 1977) concept of 'pattern language' as the language of architecture, which has been put to empirical testing Alexander (1979) Ishikawa et.al. (1977), in which they have postulated its constituents, its structure, its characteristics, and that which makes it a *language* -- a means to generate built forms that covey meaning. These concepts along with analogies between natural language and pattern language as well their disparity are expounded in the following sections.

3. The Language of Architecture: Pattern Language

A pattern language empowers each person who uses it to create an infinite variety of new and unique architectural structures analogous to their natural language which gives each person the power to generate an infinite variety of utterances. Acts of building are governed by some form of a pattern language which arises from and adds to the entire repertory of patterns that exist in the world, created by the pattern languages which people use (Alexander 1979).

3.1 The Constituents of Pattern Languages

As presented in Alexander et al (1977) and Alexander (1979), a pattern language comprises a temporal and a spatial element and therefore integrally consists of following two:

   i)   Patterns of events
   ii)   Patterns of space

3.1.1 Patterns of Events

A built form is governed by the events that take place there i.e by what is happening there. [8] In the most general sense these are: activities, events, forces, situations. Raindrops on a tin roof; hot steaming rice cakes; crows caw; water flows; streams die; a new born baby cries; a misty morning; a loved one passes away; rickshaw bells tinkle; boys play in the rain — A life can be made up of such *episodes* (Norberg-Schulz 1997). The life of every person, animal, plant, and creature is made up of such episodes. Hence the defining character of a place is imprinted upon it by the episodes of events that take place there — the pattern of events (Alexander 1979). The life of a place is not merely the physical environment but collective experiences shared there — the patterns of

events that are experienced in that place. For example — If we consider Dhaka city — no traffic rules; sclerotic arteries clogged by flatulent vehicles; tinkling rickshaw bells accompanying the shouting of profanity; exasperated policemen; roadside vendors selling delectable snacks; vendors that change seasonally to sell rice cakes, welcoming winter; pavements that provide refuge; hot steaming tea at a small tea shop on a rainy day. In contradiction we consider rural Bangladesh: green fields, yellow fields, brown fields; glimmering fishnets that catch sparkles from the sun as fishermen pull them up; children running as they chase the wind; a woman cooks quietly in the backyard; water that surrounds everything, gives life to everything and in a flash takes everything away. Hence, as Alexander (1979) denotes, a place is made of the situations: of the forces that are let loose by the configuration of events. However, the patterns of events that imbue upon it its character are not necessarily human events: any combination of events which has a bearing on one's life — an observable physical effect — affects our lives. It is the peculiarity of each situation, the actions that comprise them, the people involved that create each imprint. The life of a built form is not imparted upon it by the shape of its constituents or the orchestration of design — it is generated by the quality of the events that occur there. However, the character of a built form is given to it by the patterns of events that are *recurrent*:

> A field of grass is given its character, essentially, by those events
> which happen over and over again: millions upon millions of times.
> The germination of the grass seed,
> the blowing wind,
> the flowering of the grass,
> the movement of the worms,
> the hatching of the insects… (Alexander et al 1977)

The patterns are *variable* in that they vary from person to person, from neighborhood to neighborhood, from culture to culture. However, each built form has a particular set of patterns of events dictated by its prevailing culture. Our world, the built world, has a structure governed by and emerging from the recurrence of patterns of events (human and non-human) which are in themselves constituents of larger patterns of greater events. However, these patterns of events that keep repeating are anchored in space; for an event is inseparable from the space within which it occurs. In fact, a culture defines its patterns of events by referring to the names of the physical elements of space which are

considered "standard" within that culture. Each pattern, therefore, is almost completely defined by the spatial character of the place where it occurs.

For example, a sidewalk is a unitary system that includes (Alexander et al 1977):

(i)   the field of geometrical relationships which define its concrete geometry

(ii) the field of human actions and events which are associated with it

Hence, when we see a sidewalk in Dhaka, we see a place used for sleeping, to build a makeshift shanty home, to park rickshaws. But a sidewalk in Singapore is one that is strictly used for walking. We cannot interpret the two as a single sidewalk pattern:

> Dhaka sidewalk = space + events → one pattern
> Singapore sidewalk = space + events → another pattern

They are two entirely different patterns. Hence the inanimate geometry that we consider a built form is actually a live system comprising a coordinate collection of interacting patterns of events in space consisting of events that are repeated over and over, yet always anchored by its place in space. In order to understand the form and content of a pattern language, it is necessary to understand the patterns of space as well.

3.1.2 Patterns of Space

Patterns of space refer to the physical essence of a built form — the physical geometry that is interlaced with patterns of events. Any given built form comprises certain physical elements repeating endlessly, on the geometric level, combined in an infinite variety of combinations shown in the following excerpts from Alexander et al (1977):

> A town is made of houses, gardens, streets, sidewalks, shopping centers, shops, work places, factories, perhaps a river, sports grounds, parking...

> a building is made up of walls, windows, doors, rooms, ceilings, nooks, stairs, staircase trends, door handles, terraces, counter tops, flower pots, repeated over and over again…

Each of the spatial elements is associated with a specific pattern of events. However, the elements are variable in that they have different manifestations in every occurrence. Endless repetition of elements also has an utmost endless variation.

> ...in an urban region. Each industrial area is different, each freeway is different; each park is different; each supermarket is different — even the smaller individual elements like traffic lights and stop signs, although very similar, are never quite the same — and there is always a variety of types (Alexander 1979)

Such variation evidences that these elements themselves are not the 'ultimate' constituents of space. For example, it would be incorrect to state that all the matter is made up of atoms and molecules. But if we state that all matter is made up of electrons, protons, and neutrons, it would be a more accurate statement and a more satisfying way of understanding matter, as these constituents are indeed invariable in each and every occurrence, and hence the elements are truly elementary. Therefore, in order to find the elements of space, it is necessary to identify the elements that remain invariant throughout the variations of built forms as a structure made up by a combination of these elements. These are the *relationships* between elements exemplified further in Alexander (1979):

> over and above the elements, there are relationships between the elements which keep repeating too, just as the elements themselves repeat…

Hence beyond the physical elements each built form is defined by certain patterns of relationships among the elements as shown in the excerpt below:

> In a gothic cathedral:
> the nave is *flanked by* aisles which run parallel to it.
> The transept is at a *right angles* to the nave and aisles;
> the ambulatory is *wrapped around* the outside of the apse;
> the columns are *vertical$_2$*
> *on the line separating* the nave from aisles,
> *spaced at equal intervals*… (Alexander 1979)

Therefore, a 'structure' of a built form consists of patterns of relationships whereby the physical elements that appear to be elementary dissolve to leave behind a fabric of relationships which are

the actual elementary constituents that are recurrent and constitute the structure of a building form. The so-called physical elements are merely labels for the patterns of relationships that keep repeating. The physical features function temporarily as elements and evaporate upon close observation. Each one of these patterns is a morphological law establishing a set of relationships in space. This morphological law has the following general form:

$$X \rightarrow r (A, B...) \qquad (1)$$

Rule (1) means: within a context of type X, the part A, B... are related by the relationship r.

Thus, for example, within a gothic cathedral → the nave is flanked on both sides, by parallel aisles.

Each law or pattern is itself a pattern of relationships among further laws which are themselves patterns of relationships as well. Although a pattern appears to be composed of smaller 'parts' — these apparent parts are in themselves patterns too. As exemplified from Alexander (1979) we find 'the pattern of a door'. This pattern consists of a relationship between:

a. the frame
b. The hinges
c. The door

This in turn consists of further smaller parts. The frame is made up of

a. uprights
b. a crosspiece
c. and cover moldings over joints.

The hinge consists of

a. leaves
b. and a pin.

The door consists of

a. uprights
b. crosspieces
c. and panels.

Each of these smaller 'parts' is actually a pattern: Each one of which has infinite variations in terms of manifestation, without losing the essential field of relationships. Further, these patterns of spaces, as we have noted earlier, are associated with a respective patterns of events. Although the association between patterns of events and patterns of space is indeed a fundamental inner connection, however, this relationship is not one of *'causality'* in that patterns of events and patterns of space do not cause each other. Together the total patterns, congruence of space and events, is an element of culture.

Any built form is defined by the recurrent collection of patterns (Alexander 1979). These patterns, at the same time, seize the outward physical geometry and also seize the events that take place there:

i.   They account for the geometrical structure: the visible, coherent, recurrent elements that provide a background of the variation.

ii.   They are responsible for events which keep repeating there imprinting upon it and its character.

The close connection of patterns of events and space is commonplace in nature:

> We do not separate the stream bed from the stream. There is also no distinction in our minds between the bed of the stream, its banks, its winding configuration in the land, and the rushing of water, the growth of plants, the swimming of fish... (Alexander 1979)

The patterns which are found in the world are in themselves fairly simple, however they interact, they create slightly different configurations at every place. This arises from the fact that no two places on earth are exactly alike in their conditions and this in turn creates differences which contribute to creating different conditions which other patterns face. As Alexander (1979) denotes this as 'the character of nature'. This is not simply a poetic metaphor but a specific morphological character which is found to be common in all that in not human made in the world. Nature is not modular. It consists of similar units. i.e., sand grains, raindrops, blades of grass, etc. However, this similarity is only in terms of their broad structure. In detail each is quite different. Thus we find:

1. The same broad features keep recurring

2. In their detailed appearance

   ⇨ All mango trees have the same generic shape, similar trunk, same textured bar, the same shape of leaves, the same proportion in terms of limbs to branches to twigs, and yet no two trees are the same.

Hence, the repetition of patterns is quite different from a repetition of parts. This continuous, non-modular characteristic of nature is what makes it alive. Architects believe that in order for a built form to have life, to be natural, it must emulate nature in this respect and that which allows it to bear such characteristics is the power of generativity (Gandelsonas 1973). In nature, we find, if we want to make a living natural flower, it is not possible to build it, cell by cell or even piece by piece. It can only be grown from the seed: in other words, it can only be generated. A building which is natural, which is valorized, which belongs in one that is generated and not one that is simply *built*. It is this generativity that compelled architects to surmise that there is an underlying code required to generate built forms that are natural and alive. The notion of a code, that is generative, is most commonly found in human language and it is due to this point of convergence that architects consider the fluid process of generating built forms a visual language — the pattern language.

3.2 Defining the Concept of a Pattern

In order to understand how patterns in a pattern language work it is necessary to delineate what is meant by a *pattern*:

A pattern is a unit of "the world" — a unitary pattern of activity and space that is recurrent, in any given place, and appears each time in a slightly different manifestation. These patterns are our own creations: they are the products of the collective body of patterns that exists in our minds and from which we imagine, conceive, create, build and live these patterns in the world. These patterns in our minds are primarily mental images of the patterns in the world: 'they are abstract representations of the very morphological rules which define the patterns in the world' (Alexander et al 1977).

Each pattern, however, is not a *thing*; each pattern is a *potent field*: a complex bundle of relationships capable of being different in each occurrence and yet deep enough to be generative each time (Alexander 1979). A collection of such deep patterns whereby each one is a fluid field, is capable of combining and overlapping in entirely unpredictable ways and generating an entirely unpredictable system of new and unforeseen relationships. Thus the patterns are empowered by the collective creativity of the system of patterns already present in our repertoire.

3.3 Pattern Language and Langue-Parole

Alexander's (1975, 1977, 1979) concept of patterns appears to be reminiscent of Saussurian concepts of language (Saussure 1974; Harris 1987) comprising:

1. Langue: The totality (the 'collective fact') of a language, deducible from an examination of the memories of all the language users.

In a pattern language, langue appears to be analogous to the collective body of patterns in our minds. These are dynamic, have force, and are generative.

2. Parole: The actual language usage of individuals which a community manifests in its everyday speech i.e. the utterances that have actually been produced.

In pattern language the parole are the patterns that exist in the world: that have already manifested. Each pattern in the langue is primarily a set of instructions on how to generate the entity which it defines.

Considering an example from Alexander et al (1977), if we consider the pattern of hillside terraces, used in hilly countries to make usable farmland on hilly slopes we find:

1. The parole:
    the terraces follow the contour lines;
    the terraces are spaced vertically at roughly equal intervals;
    the terrace is formed by a wall along its outer edge, which keeps the earth from sliding.
    Each of these outer walls rises slightly above the level of the terrace which it retains, so that it also keeps water there, evens out the rainfall, and prevents erosion. (Alexander et al 1977)

All of this defines a pattern – the relationships which define the pattern in "the world".

2. The Langue: the langue is the pattern 'in the farmer's mind': It contains the same information, only in more detail and is less superficial.

In addition, it contains two further aspects:

A. It includes the knowledge required to build such a system of terraces.

    ⇒ The fact that the walls are built before the terraces are filled in and leveled;

        The fact that there are small drain holes in the outer walls; etc.

Hence, 'the terracing' presents itself as a rule which tells the farmer what to do on an existing hillside to transfer it into the state which has this pattern in it. In other words, it's a rule (the langue) which allows him to generate the pattern into a parole.

B. The pattern also has an imperative aspect in that it basically solves a problem.

    ⇒ The pattern is not only one of choice but one that is necessary for some purpose i.e. for a person who wants to farm on a hillside and prevent it from erosion.

The pattern not only governs the person but may be mandatory in certain particular contexts, in that it is essential for it to be manifested as a parole. In this sense, the system of patterns forms a language. When a builder applies the patterns for a particular type of built form in the proper order, they are able to generate the desired built form. The built form will always have the particular relationships required by the patterns; however, variations in sizes, angles, relationships, depend upon the requirement of the situation and the preferences of the builder. The family of built forms of that genre produced by this system, all share morphological features specified by the rules. Beyond that there is, literally, endless variety.

4. The System of Pattern Languages: Analogies with Natural Language

In order to exemplify the system of pattern languages Alexander et al (1977) draws analogies with a logical language and a natural language.

4.1 Logical Language

From a mathematical point of view, a logical language is the simplest kind of language consisting of two sets:

(1) a set of elements or signs

(2) a set of rules for combining these signs

In a logical language:

i.   the signs are completely abstract

ii. the rules are the rules of logical syntax

iii. the sentences are basically well-formed formulae

For example,

Set of signs: *, +, =, x

Rule (2): "the same symbol must never occur twice consecutively in the same row"

Based on the above:

(a) grammatical sentences would look like:

(i)   * + * + * + * + *

(ii) * x = * = + = * x

(b) ungrammatical sentence would look like:

(i)   x = x = + * * + =

4.2 Natural Language

A natural language is infinitely more complex. It consists of:

(i) A set of elements: phonemes, morphemes, etc.

(ii) A set of rules: syntax

In addition,

(iii) A complex network of semantic connections.

For example: In English, if we take "the tree is standing on the hill",

The elements are → tree, the, hill, etc.

The elements are combined according to certain rules:

⇨   that the existential copula 'to be' must be transferred into 'is' in this context, etc.

Further, the meaning of the entire sentence comes from the network of connections among the elements

⇨   'tree' grows in the 'ground' and that a hill' is a kind of 'ground' and hence the tree can therefore stand on a hill.

4.3 Pattern Language

The pattern language is an even more complex system (Alexander et al 1977):

i.   the elements are patterns

ii.   there is a structure on the pattern that describes how each pattern is itself a pattern of other smaller patterns

iii. there are rules, embedded in the patterns which describe:

a.   the way that they can be created;

b.   the way that they must be arranged with respect to other patterns

The primary differences are that in a pattern language the patterns are both elements and rules simultaneously and hence rules and elements are indistinguishable. Each pattern is an element. Each pattern is also a rule which describes the possible arrangements of the elements — themselves being again other patterns. A natural language like English is a system which allows us to create an infinite variety of one-dimensional combination of words called sentences:

I.   it tells us which arrangements are grammatical and which are not

II.   it tells us which arrangements are meaningful in a given situation and which are not

III. it narrows down the total possible arrangements of words which would make sense in any given situation.

IV.   It actually provides a system which allows us to produce sentences which make sense.

Hence it not only defines the sentences which make sense in any given situation, it equips us with the apparatus we need to create sentences

(Hillier and Leaman 1976). In other words, it is a generative system which allows us to generate sentences that are appropriate to any given situation. A pattern language is a system which allows its users to create an infinite variety of three dimensional combinations of patterns which we call buildings, gardens, towns, i.e. built forms (Alexander et al 1977):

(i) it defines the limited number of arrangements that make sense in any given culture. This is a far smaller collection than the entire number of arrangements that are nonsensical → kitchens on top of free-way interchanges, trees growing upside down inside a railway station — that can be done but would make no sense.

(ii) A pattern language gives its users the power to generate these coherent arrangements of space

Thus, just like natural languages, the pattern language is generative. It not only tells us the rules of arrangement but also shows us how to construct arrangements which satisfy the rules. Alexander (1979) summarizes the points of convergence of the two in the following manner:

> Both ordinary [natural] language and pattern languages are finite combinatory systems which allow us to create an infinite variety of unique combinations, appropriate to different circumstances at will.

If we compare natural language to pattern language, we find:

Natural Language	Pattern Language
♦ Words	♦ Patterns
♦ Rules of grammar and meaning which give connections	♦ Patterns which specify connections between patterns
♦ Sentences	♦ Buildings and places"

Here is the outline of a simple pattern language for stone houses in south of Italy (Alexander 1979):

a. Square main room, about 3 meters

b. Two step main entrance

c. Small rooms off the main room

d. Arch between rooms

    e.   Main conical vault
    f.   Small vaults within the cones
    g.   Whitewashed top to the cone
    h.   Front seat, white washed

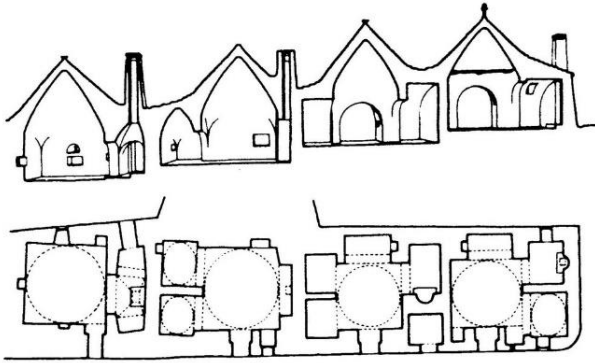The pattern language above generates the very simple houses in the following drawing:

Diagram 1: Alexander '79:189

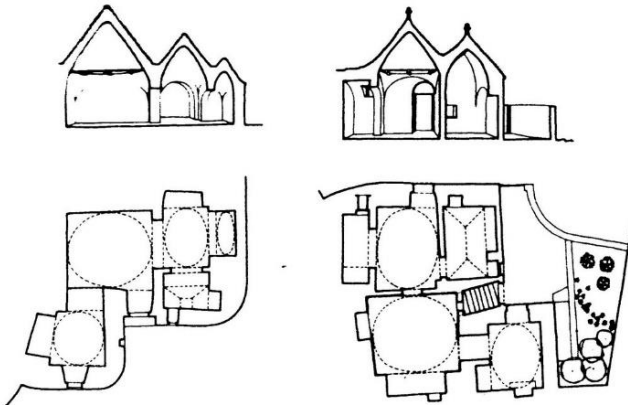And the more complicated, less similar houses, in this second drawing:

Diagram 2: Alexander '79:189

In this case, the pattern language not only helps the people shape their houses, but also helps them shape their streets and town collectively. For instance, there are further patterns in the language which includes:

    a.   Narrow streets

    b.   Street branching

    c.   Front door terraces

    d.   Connected buildings

    e.   Public wells at intersections

    f.   Steps in the streets

Diagram 3: Alexander '79:190

These larger patterns create the structure of the town. If every person who makes an individual house, at the same time follows these larger patterns, step by step, and does whatever they can with the layout and the placing of their house to help create these larger patterns too, then the town slowly gets its structure from the incremental aggregation of their individual acts (Broadbent et al 1982). Each person uses the language a little differently. Each person uses the language to make the building which reflects their dreams, to meet the special needs of their

own family, the way they live, the animals they keep, the site, and its relations to the street. But overall, throughout the differences, there is a consistency and a harmony created by the repetition of the underlying patterns. Hence, according to Alexander (1975, 1977) and Alexander et al (1977) a pattern language is:

> a finite system of rules which a person can use to generate an infinite variety of different buildings — all members of a family — and that the use of language will allow the people of a village or a town to generate exactly that balance of uniformity and variety which brings a place to life (Alexander et al 1977)

Thus, architecture is a visual language of patterns in that:

(i)   it is a code of distinguishable elements
(ii) the elements are recurrent
(iii) the code is shared
(iv) it is generative
(v)   it is communicable

However, this pattern language has some dramatic points of differences from a natural language whereby, a pattern language consists of a far more complex system whereby the elements are at the same time elements and rules. A pattern language is one that can be created from the pattern langue that is inherited. A natural language, on the other hand is one that is inherited or acquired and never created. There is no such notion as a good language or a bad language in natural language, however a pattern language that has been created can be good or bad in terms of its empirical viability in whether the built form succeeds in becoming naturalized and takes on a life of its own.

Pattern languages are a source of beauty and of ugliness. They are the source of all creative power:

> Nothing is made without a pattern language in the maker's mind; and what that thing becomes, its depth, or its banality comes also from the pattern language in the builder's mind (Alexander 1979)

4.4 The Structure of a Pattern Language

A pattern language, as we have seen, can be created by discovering living patterns that can be shared whereby we can reach some

reasonable degree of confidence in their reality (Gandelsonas 1973). These patterns can cover every range of scale in our surroundings:

- i.   largest patterns cover aspects of regional structure
- ii. middle range patterns cover the shape and activity of buildings.
- iii. smallest patterns deal with the actual physical materials and structures.

These patterns are combined to form coherent languages. The possibility of language is latent in the fact that patterns are not isolated. This latent possibility comes out in full force once there arises a desire to create something (Foucault 1970) — the desire which puts a structure on patterns and produces a language from them. The structure of a pattern language is dependent upon the following principle (Alexander 1979):

- A. Individual patterns are not isolated

Each pattern depends upon the following two:

- 1) The smaller patterns it contains
- 2) The larger pattern within which it is contained

For example, let us suppose we have chosen the following patterns to make a garden:

- i.   HALF HIDDEN GARDEN
- ii.   TERRACED SLOPE
- iii.   FRUIT TREES
- iv.   TREE PLACES
- v.   GARDEN GROWING WILD
- vi.   ENTRANCE TRANSITION
- vii.   COURTYARDS WHICH LIVE
- viii. ROOF GARDEN
- ix.   BUILDING EDGE
- x.   SUNNY PLACE
- xi.   OUTDOOR ROOM
- xii.   SIX FOOT BALCONY

xiii.   CONNECTION TO THE EARTH

xiv.   GREEN HOUSE

 xv.   GARDEN SEAT

Each one is incomplete, and needs the context of others to make complete sense. For example:

A GARDEN WALL, when taken out of context is a mere pile of bricks — It becomes a garden wall only when it surrounds a garden i.e. when it helps to complete HALF HIDDEN GARDEN or GARDEN GROWING WILD. And ENTRANCE TRANSITION, by itself, is merely a place in the open air. What makes it an entrance transition is its position in between the front door and the street and its view into the more distant garden; in other words, the fact that it helps to complete the language pattern MAIN ENTRANCE and is itself completed by the smaller pattern ZEN VIEW. Each pattern is the center of a network of connections which connect it to certain other patterns which in turn serve to complete it. For instance, if we consider:

i.   a dot (.) to stand for each pattern

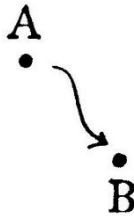ii.   an arrow ($\rightarrow$) to stand for each connection, we find.

Diagram 4: Alexander '79:313

Here,

1)   Pattern A needs pattern B as part of it in order for A to be complete.

2)   Pattern B needs to be part of pattern A in order for B to be complete.

If we picturize *all* the patterns which are connected to pattern A, then we will find that A sits at the center of an entire network of patterns — some above it, some below it.
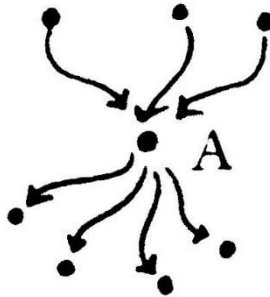
Diagram 5: Alexander '79:313

Every pattern thus sits at the center of a similar network and it is the network of these connections between patterns that creates the language.

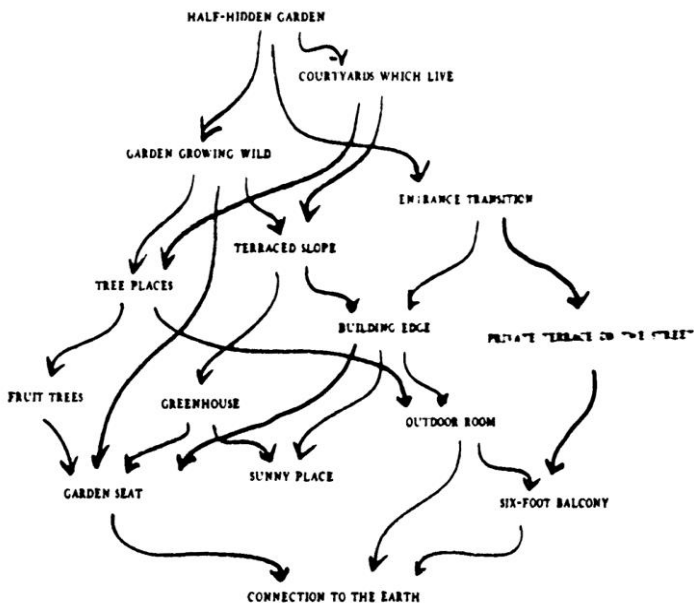Hence, a language for a garden might have the following structure:

Diagram 6: Alexander '79:314

In this network, the pattern language created has two necessary parts:

1) the links between the patterns
2) the patterns themselves

It is the structure of the network which makes up individual patterns, as it anchors them and helps make them complete. Each pattern is modified by its position within the language as a whole: in accordance with the links which form the language. By virtue of its position in the whole, each pattern becomes especially intense, vivid, easy to visualize and perhaps more richly visualized. The language not only connects the patterns to each other by giving each one a realistic context, but helps to bring them to life and thus encourages imagination to give life to the combinations which the connected patterns generate. However, as Alexander (1977, 1979) describes it, pattern languages can either be 'good' or 'bad', in other words there is a sense of grammaticality in that pattern languages can either be grammatical or ungrammatical. In the following we shall define the characteristics of a grammatical pattern language.

4.5 A Grammatical Pattern Language

As Alexander (1975, 1979) and Alexander et al (1977) denote, pattern languages can have the quality of being good or bad, and a good pattern language has two criteria:

1) It is morphologically complete.

2) It is functionally complete.

A pattern language is morphologically complete, when the patterns together form a complete structure, filled out in all its details, with no gaps whatsoever. The pattern language thus is morphologically complete when the form of building it can generate can be visualized very concretely. This basically means that the general 'species' of buildings which the language specifies can be visualized completely- not as a vague form full of gaps, but as a solid, complete entity (Broadbent et al 1982). A language is functionally complete when the system of pattern defined by it is fully capable of allowing all its inner forces to resolve themselves. In any system of patterns, inconsistent systems of conflicting forces can exist which, when not resolved internally, can gradually destroy the system (Gandelsonas 1973). Hence, a pattern language is functionally complete when all the internal systems of forces are accounted for- when there are enough patterns to bring all these into equilibria. This not only applies to the whole language but to each individual pattern as well. Hence, a pattern

is said to be alive if its individual statements are empirically true with an instruction in the general form of:

(3) context $\rightarrow$ conflicting forces $\rightarrow$ configuration

A pattern is thus viable wherever it meets the following two empirical conditions:

1) The problem is real – a conflict of forces which occur within the stated context.

2) The configuration solves the problem - the stated arrangement pf parts present in the stated context can resolve the conflict. Thus each pattern functionally has a three-part rule:

   a. A relation – a relation between a certain context

   b. A problem – a certain system of forces which occurs repeatedly in that context

   c. A solution – a certain spatial configuration which allows these forces to resolve themselves.

Within a pattern language every single pattern must be morphologically and functionally complete for the whole language to be complete and generative.

4.6 The Poetry of Pattern Language

One of the remarkable aspects of a pattern language is that, like a natural language it can be a medium for prose or it can be a medium for poetry (Antoniades 1992). As we know, the difference between prose and poetry arises by using the same language differently. In an ordinary sentence (in a conversation perhaps) each word usually carries a simple straight forward meaning, and the sentence thus has a simple meaning too. However, a sentence or word in poetry is far more 'dense' – each word carrying several meanings and the sentence as a whole carries an enormous density of interlocking meanings which together illuminate the whole. This layering of meaning is applicable in the case of pattern languages as well whereby a built for can be made in two ways (Alexander et al 1977):

1) By stringing together patterns in a rather loose way – a built form made in this manner is a mere assembly of patterns. It is neither dense nor profound.

2) By putting together patterns in such a manner that many patterns overlap in the same physical space: the built form thus produced is very dense: with many meanings captured in a small space and thus through this density it becomes profound.

When two patterns exist in the same space there is a compression of the two which requires less space which is more profound in depth of meaning than in a place where they are merely side by side. The compression illuminates each of the patterns, sheds light on its meaning and in turn illuminates our lives in terms of how we understand the connections of our inner needs (Antoniades 1992). To some degree, there is compression in every single word we utter as each word carries the whisper of the meanings of the words it is connected to. Each sentence has some compression in it because it carries overtones that lie in the connections of these words to all the words which came before it. Each of us makes use of these compressions which are drawn out from the connections between words which are given by the language. The more we can understand all the connections in the language, the more which and subtle are the things we say at the most ordinary times. The same is true for a pattern language. The compression of patterns into single space provides the most ordinary economy of space and yet the built form thus produced can be a poem.

Thus we have explored how architecture is articulated as a language whereby there are certain striking points of resemblance with natural language and yet a marked disparity as well. The language of architecture as we have seen is a code that conveys meaning, can be generative, and through its generativity, can establish communication.

5. Future work: Transposing a Superlinguistic Analysis

We have set up the premise of architecture as a form of visual language that conveys enculturated meaning, with finite elements and rules i.e. a grammar that govern the combination of said elements to create meaning and establish communication. We can therefore propose an analysis of this visual language by transposing formal tools of linguistics-- a superlinguistic analysis of a medium of communication that is beyond mere words and sentences. Superlinguistics is an

emerging sub-field of linguistics that applies formal linguistic tools of analysis to study objects beyond language. Such an analysis can enrich our understanding of how meaning is expressed and structured in human constructs involving non-verbal elements. Conversely, for the field of architecture such an analysis will provide a unique perspective in understanding the meaning embedded in the structure, and will go beyond conducting a mere structural autopsy of built form.

6. Conclusion

The scope of language study aspires to analyze language as a universal, inherent and recognizable part of human behavior, by describing and analyzing all types of languages. In short, the field of linguistics aims to study of language in all its form and manifestations (Fromkin et al 2018). However, it is often delineated on the basis of the components of a natural language, with a goal to seek a scientific understanding of the place of language in human life, the ways in which it is organized to fulfill the needs it serves and the functions it performs. Although linguistics is called the scientific study of language it is not a 'hard science' such as physics from which most scientific methods and nomenclature have entered educated speech (Kieth 1981). As we have seen in the past, such attempts at making linguistics a pure science was executed by banishing meaning from the calculation of language analysis resulting in linguistic models which recognized a semantic system associated with language rather than a semantic level of language; leading to an inevitable implosion of the models. Although language study has come a long way from such implosive models, culture and systems of meaning still remain pushed towards the periphery of the concern of linguistics. As the study of any system of expression involves the study of meaning, it requires a more qualitative than a mechanistic approach. Meaning in language, as implied by Merleau-Ponty (1964), is qualitative and requires the mediation of consciousness which is outside the realm of mechanism. Meaning can be expressed in ways that traverse the limitations of the acoustics of speech. One such means of creating meaning that is culturally-ingrained is architecture — a visual and socio-cultural language. In this paper we explored the analogy between architecture and natural language by describing the concept of pattern language and its elements, and positing architecture as a pattern language. As

postulated here, pattern languages have finite elements as well as rules of combination which govern grammaticality, similar to the elements and rules of grammar of a natural language. Pattern languages can also traverse grammaticality and weave together literary forms such as pattern language poetry analogous to natural languages. The framework of architecture as language described in this paper can form the premise for a superlinguistic analysis using the formal tools of linguistics, as a future endeavour.

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