The Taxonomy of Spatial Typologies: A Proposal for an Analytical Language

BENJAMIN BROSS
University of Illinois at Urbana-Champaign

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As the phenomenon of globalization permeates across political and socio-cultural boundaries, one of its major effects is an increasingly homogenized spatial landscape. Lefebvre noted spatial production is "secreted" cultural production, so globalization is tantamount to an increasingly homogenized world culture. Designers who push back on spatial globalization eschew Modernism's break from the past or Post-Modernism's poly-narrative but literal u-topic emphasis, utilizing a design approach based on site-specific contextual and historic factors ranging from climate to socio-culturally produced typologies.

Spatial typologies are synchronous with spatial production: their emergence, evolution and extinction exemplify a society's material culture at specific places and times. e.g., nearly 46 centuries ago, Egyptian pyramids emerged as the salient funerary typology; thousands of years later, department stores typified the logic of capital, as the Industrial Revolution produced spaces that addressed the consumer demands of a growing bourgeoisie class.

The emergence of Post-Modernism in arts and social sciences in the 1960s signaled a more liberating design approach because it embraced alternative design directions, including the reincorporation of traditional praxes of spatial production such as typologies. Rudofsky, in Architecture without Architects, reminded us that spatial production was not the exclusive domain of the formally trained designer but, more importantly, that vernacular space itself was a legible representation of a society's values; typologies were once again important and merited documenting. Later, Pevsner noted in A History of Building Types "there is…no history of building types in existence." Emulating the science of taxonomy, the paper proposes systematic criteria for identifying and categorizing typologies. In this approach, emphasis is placed on tracing changes in spatial morphologies over time, such that spatial relationships are revealed between earlier antecedent typologies and their contemporary iterations. This is possible because, like genetics, typologies reveal qualifying components that may illustrate iterative mutations, revealing "evolutionary drifts" or "selection processes."

INTRODUCTION

As the phenomenon of globalization permeates across political and socio-cultural boundaries, one of its major effects is an increasingly homogenized spatial landscape. Henri Lefebvre noted that the built environment, or ***spatial production,*** is "secreted"[1] cultural production. This suggests that the effects of globalization are an increasingly homogenized world culture. In the context of design, globalization is a process whereby groups that were historically distinguishable by their cultural production, now exchange spatial production from other distinct groups. Exchange of spatial products may be through emulation or imposition (i.e. colonization). In some cases, because of spatial globalization, traditional or vernacular forms of spatial production have ceased contemporary production, or equally unfortunate, once existing built environments have been proactively demolished and replaced with then socio-culturally foreign spatial typologies. In other cases, new typologies have emerged that fuse different spatial production traditions. The sum effect of these spatial product manifestations is an increasing sense of *placelessness* through the "stamping out of cultural diversity."[2] Spatial producers who have chosen to push back on this aspect of globalization seek to do so by preserving, augmenting, or reinventing historically rooted spatial products in order to strengthen place-identity. They eschew Modernism's willful break from the past or Post-Modernism's poly-narrative but ***utopic***[3] emphasis, by utilizing a design approach based on site-specific contextual and historic factors ranging from climate to socio-culturally produced ***spatial typologies.*** Where ***typology*** is defined as

> [t]he classification of objects, structures, or specimens by subdividing observed populations into a theoretical sequence or series of groups (types) and subgroups (subtypes) according to consideration of their qualitative, quantitative, morphological, formal, technological, and functional attributes. Once established, typological sequences are often used as a surrogate chronology or culture history.[4]
>
> —"Typology," The Concise Oxford Dictionary of Archaeology.

Central to this approach is the recognition that *spatial typologies* are synchronous with human spatial production

Figure 1.Fennec Fox vs Arctic Fox. Copyright free images.

and specialization: their emergence, evolution and extinction exemplify a society's material culture at specific places and times. For example, nearly 46 centuries ago, Egyptian pyramids emerged as a salient funerary typology; thousands of years later, department stores typified the logic of capital, as the Industrial Revolution produced spaces that addressed the consumer demands of a growing bourgeoisie class. Typologies were so important that designers, from Vitruvius to Jean-Nicolas-Louis Durand, proposed normative design treatises that codified "appropriate" building types in response to contextual, socio-cultural, political, and economic factors. Reaction to the codification of "appropriate" form was one of the major factors that led to the 19th century Modernist design revolution. Modernism's willful break from the past had indeed liberated designers from traditional forms, but it had also paved the way for an increasing sense of form ubiquity – reaching its most global expression with the *International Style.*

The 1960's marked the arrival of a Postmodernist vision across the social sciences and artistic practices. The abandonment of the Modernist Meta-narrative directive was not only liberating because it presented the opportunity to seek new design directions going forward but also permitted the reincorporation of traditional praxes of spatial production. Architects such as Robert Venturi, Aldo Rossi, and Charles Moore embraced and reinterpreted a vast library of historic forms. Moreover, in *Architecture without Architects* (1964), Bernard Rudofksy, as MoMA curator, embraced the notion that *spatial production* was not the exclusive domain of the formally trained architect (or engineer) but more importantly, argued that *space* itself was an effective representation of a group's multicultural values and their traditional productive systems. In 1970, Nikolaus Pevsner noted in the foreword of his now canonical work *A History of Building Types* that "there is…no history of building types in existence." While the research recognizes that Kostof, Trachtenberg, Curtis, Frampton et.al., have chronicled architectural and urban interventions—landscapes, urbanscapes and buildings—this paper follows Pevsner's work not by documenting typologies *per se* but by proposing a vocabulary—a spatial taxonomic language- that standardizes the rules of *spatial production classification*. While heeding Foucault's critique of a hermetic classification of knowledge in *The Order of Things*, this paper also draws from his work the possibility of systematic criteria for identifying and categorizing *typologies*.

METHODOLOGY

Design discourse and the study of spatial production—including architecture—borrows from other methods of inquiry, including Philosophy and the Social Sciences to provide structured inquiry. For the purposes of illustrating the configuration of spatial morphology as a discrete analyzable unit, this essay borrows from the "hard" science of biology, and its sub-discipline of taxonomy as its model. Following Kenneth Bailey's seminal work, *Typologies and Taxonomies, An Introduction to Classification Techniques*, Bailey notes that the "basic rule is that the classes formed must be both exhaustive and mutually exclusive."[5] This means that classification is only as good as the criteria that differentiate one group from another. It follows then, that space types are deduced from the general (most

Figure 2. Splitzhauschen, courtesy Bethold Werner. Wikimedia Commons.

inclusive of properties/qualities) to the specific (most exclusive of properties/qualities) of spatial identity in order to categorize and name a spatial product group type. In other words, the "fundamental point here for taxonomy is the modern idea that it is populations, not specimens, that are being classified."[6] Using this model, spatial taxonomy emulates the three main classification approaches found in biology: *morphospecies, phylogenetic* and *biospecies*.

Morphospecies is a taxonomic system that classifies through the use morphological components or traits sufficiently shared (similarities) by a group[7] as to identify and differentiate one biological taxa[8] from another. In living organisms, analysis of morphological *traits*[9] reveal information about the evolutionary forces at work in the emergence of that component, including food niches, topography, climate etc. For example, Fennec fox (*Vulpes zerda*) ears (fig.1) are comparably larger than those of fox species from cooler climates, e.g. the Artic fox (*Vulpes lagopus*) because the former must dissipate body heat quickly to survive. Hence, fox species whose major differentiator trait is comparably larger ear sizes would reveal an intimate relationship with a hot biome. In much the same way, typological spatial traits reveal relationships between spatial forms and functions. As with morphospecies typology, spatial forms can be matched with one or many of the following spatial product generators: cultural, political, climatic, topographic, material and chronological. For example, buildings with highly pitched roofs suggest[10] this trait is in response to rain and/or snow loading (fig.2). While, compacted soil and clay wall structures are associated with low rainfall environments, such as the adobe homes of the American Southwest, or Mali's Great Mosque of Djenné (fig.3).

A second approach is the *phylogenetic* spatial classification which "are historical entities…resulting from the process of common evolutionary descent."[11] This approach privileges evolutionary relationships between objects sharing a common spatial ancestor, and hence binding them to a historic continuum while simultaneously downplaying morphological traits. One way to understand this approach is to think of genetic inheritance and generational mutation from organism to organism (i.e. genealogy). In spatial production for example, the design push during the Gothic period for taller and better-illuminated interiors led to the use of significantly larger glass surfaces and structural buttresses, demarcating a clear formal break from its immediate antecedent, the Romanesque Cathedral. This approach enables the analyst to trace phylogenic[12] changes through time and location detecting variations from group to group as a response to specific set of environmental circumstances, in much the same way we might observe a living organism's immediate *environmental plasticity*[13] or through long-term *local adaptations*.

Finally, the third major biological taxonomic model is that of *biospecies*. In biology, this classification approach is defined by the capacity for an organism to breed with another and produce viable offspring. In spatial production, this classification process applies to products based on the capacity of any human producer belonging to a certain group to produce a specific spatial taxon product such that it is sufficiently similar to other examples of that spatial typology. For example, a Mongolian *ger* is a prevalent residential spatial product of people from the Central Asian steppes; as such, it is reasonable to expect that any given ger found in Mongolia, could be classified as belonging to a taxon of gers. Taken together, all three approaches to spatial taxonomy -though often overlapping- enable consistent methodological approach to establish a phylogenic nomenclature for space.

SPONTANEOUS AND EVOLUTIONARY SPATIAL PRODUCTION

Anthropological and Archeological research has demonstrated spatial production to be synchronous with human biological and socio-cultural evolution. Moreover, analysis of spatial production history reveals two modes of spatial production: spontaneous and evolutionary. The former is the initial appearance of spatial product, conceptually the moment of *invention,* while the latter is a divergence from a common ancestor as exhibited by further spatial specialization, trait mutation/drift or in some cases the full reconfiguration of a known space-type but not its intended function—conceived as morphological continuous improvement[14] or innovation.[15] Evolutionary changes originate either with genetic drift, defined as "the change in the genetic composition of a population over

Figure 3. Great Mosque of Djenné, Mali. USDA.

time as a result of chance or random events,"[16] or through environmental plasticity, where the species has an immediate change that allows to prosper where others fail. For example, changes in roof ornamentation from Shang to Zhou Dynasties exhibit drift, while reinforcing fortified walls to fend off artillery fire in the 15th century demonstrate function-based environmental plasticity. Often anthropologists and archeologist employ the identification of spatial types as a "relative"[17] dating tool, since specific spatial typological iterations belong to or bound a known period[18], or because they have ceased to be produced after a certain period. In view of the above three taxonomic classification approaches, the next step is to develop spatial taxonomic terms that enable users to determine traits that *mark* the initial appearance of a spatial typology or describe the ways in which a spatial product vary from antecedents and among contemporary expressions.

SPATIAL TAXONOMIC LANGUAGE

Central to the thesis of typology-based design, is establishing a common classification language that spatial producers can use while analyzing site-context spatial specimens. Scientists, such as Carl Linnaeus, have suggested that taxonomy develop a clear, logical, and standardized descriptive language of the components of living (or once living) organisms. One of original[19] tenets of the Linnaean binomial nomenclature system is that each taxon's name reveals descriptive information about a specimen, so that the use of progressively larger taxa membership groups, identifies the imbedded history (phylogeny) of a particular species. Similarly, this paper proposes a series of *terms* that identify different aspects of space much in the same way that biologists identify properties that indicate a specific set of qualities or traits possessed by organisms.[20] While there is no need for Latin (as in biological taxonomy) or another language to be imposed universally as *the* language of spatial taxonomy, what is necessary is to standardize terms that embody concepts—rules—of classification. These terms are by their *sorting* nature effectively classification rules, because they identify and group typologies based on predictable and increasingly specific intrinsic and extrinsic qualities of the spatial product itself.

Speciel type: The first and principal proposed term is *speciel* (plural *speciels*), derived from the words "species" and "spatial." In biology, *species* is defined as "a group of living organisms consisting of similar individuals capable of exchanging genes or interbreeding. The species is the principal natural taxonomic unit, ranking below a genus and denoted by a Latin binomial."[21] Using the *morphospecies* and *biospecies* methodologies, speciel types display morphologies and functions of its spatial antecedents, presenting minimal variations between specimens of the same grouping. It is important to remember that speciel, like species, is the taxon classified by the strictest trait requirements. Speciel typologies that may be further grouped by shared *variations* are *kinds* (in animals, *breeds*). For example, "California Bungalows," denotes the speciel typology of single-family houses produced in the early 1900s in Southern California. It is important to note, however, speciel is not a singular example or specimen.

Speciel taxa are the *phylogenetic* result of spatial production, encompassing all traditions and processes of spatial production culminating in the typology pertaining to a bounded place and time. For example, we can deconstruct the *speciel* typology of a Gothic Cathedral in order to study its components and how they are configured to determine the *essential* components and functions that make a space specifically a Gothic Cathedral. These components and qualities are listed as requirements: apse, transept, nave, side aisles, high ceilings, flying buttresses, leaded windows, built 10th and 15th centuries, by Europeans, all seem to be *essential* traits of the taxon Gothic Cathedral. Through spatial analyses, we may trace a Cathedral's forma based phylogenetic evolution from the Greek *stoa*, through the Roman Basilica, unto the Romanesque church and finally to the Gothic Cathedral. By analyzing the Cathedral *speciel*, we recognize that its typological specificity is history dependent –that is, the product of changes to morphology and function correlated with a time and a place.

Furthermore, we can parallel biological guidelines to determine *kinds*. Using *Felis Catus* (domestic cat) as an example, inspection of the specimen's phenotypes reveals sorting information: does it have a long or short coat? Is it gray or brown? Does it have blue or green eyes? Similarly, we can examine a building or landscape and explore its overall form and function or specific spatial components use of materiality, construction techniques, ownership/commissioning, purpose, chronology etc. By enumerating descriptive questions and answers, we can determine that we are looking at a Southern California Bungalow instead of a California Ranch-style specimen. Returning to our Gothic Cathedral example, we might take a close look at its walls and inquire about its stone cladding. Specifically, what stone was used? Where did the stone come from? Who cut it? What shape was the stone quarried into and with what tools? Answering these questions, helps determine not only what *specimen* of *speciel* we are looking at, but also *when* it was produced. We could further intuit, as Roger Chartier[22] has demonstrated, a narrative supported by empirical observations of the process of production in the making of the built environment. This type of empirical knowledge, however, would only help determine what *kind* of *speciel* we are studying, but not what function is inherent in its spatial configuration. In fact, this essay argues that two analytic components produce sorting criteria to identify speciel types: descriptors and performants.

Descriptors: When we use adjectives to describe physical characteristics of spatial production, we are using *descriptors*. Dark, big, tall, cold, are *perceptual descriptors* that describe sensations produced by a space. Pertaining to Phenomenology, *perceptual descriptors* modify and attenuate, define and specify the qualities of space, including those qualities that are immediately apparent to the five human senses (including the possibility that you should taste a material!). These differ from *tectonic descriptors*, which describe materiality such as brick, stone, wood, glass, red, translucent, black and so on that describe the materiality of the speciel space. In general, descriptors inform us of the qualities *speciel* types that shape our experience of space. Perceptual and tectonic descriptors may be incidental—that is not essential—to the function of space, such as flooring surface of granite instead of wood, such that change in dimensions or materiality does not change membership in a *kind* grouping. Descriptors, however, may actually be an integral element of the proper functioning of the typology, such as stainless steel surfaces for a surgical suite.

Performants, in spatial taxonomy, are the physical components that bound space, the voids between them, and the Cartesian dimensions that describe their relationships and whose legible totality enable a space to function. Hence, when describe the spatial configuration of repeating uniform modular spaces, such as cell units found in a "prison," we understand that the typology of prison is discernable primarily because of the *performant* nature of the configuration of the repeating spatial geometries. Where *programmatic description* informs us what the purpose

of the space is, for example "prison: a building designed to hold individuals against their will," it is the performant elements of a four-sided confined space with two openings, presumably one a window with steel bars, and the other an aperture obstructed with a steel gate, that make it prison cell. Whether the prison cell is made with CMU walls, or poured concrete has ultimately little impact on the nature of a performant. Equally important, *performants* deny, inhibit or promote by their very conceptualization the possibility of other functions.

The following terms focus on naming, and hence identifying, morphological and phylogenic shared or differentiated traits as categories. In the case of morphospecies, each group or taxon, is defined and bounded by three main criteria: First, that each member of a taxon possess certain fundamental *performant* components, and second, a critical number of these *performant* components. Third, descriptors are sorting traits if they are either a) intrinsic to the *performant* nature of the space[23] or b) determined to be essential to spatial identity.[24] In the case of the phylogenetic approach, each of the current speciel type's traits is traceable to an antecedent speciel type. These two approaches, in combination, generate a descriptive vocabulary through which an analyst may determine specific criteria (components, number, and origin) of trait commonality that establish a taxon or conversely, with each variation, determine if a new taxon is established.

Composed space exist in two manifestations, *Chimeric* and *Composite*. *Chimeric* space, like the mythological Chimera, is conceptualized from the inception as formed by two or more *speciel* types that require each other to function, in a symbiotic relationship. These special spaces are produced in a simultaneous period. Though acting as one spatial object, differences between the two or more speciel types should be clearly legible. *Composite* spaces are those spaces produced by the accretive addition of *speciel* types over time, as a response to spatial needs at varying times and often expanding the original object.

Hybrid space is produced where two or more speciel types produce a third that is different from its ancestors, but clearly contains properties of the previous two or more speciel products. Hybrid speciel typologies may refer to the processes of spatial production when defined as "the *ways* in which forms becomes separated from existing practices and recombine with new forms in new practices."[25,26] It is possible that a *hybrid* speciel exhibit one ancestor as dominant over another, or that previous spatial expressions seem balanced in there contemporary form. *Syncretic* space, however, presents a special *hybrid* condition. Where *hybrid* space demonstrates inherited spatial properties from its ancestors to produce a new third way, *syncretic* space is defined by the appropriation of antecedent *form* (and its attributed functions) but whose new *functions* (and expected forms) do not relate to the original source.

Appliqué describes when surfaces associated with of one speciel space are superficially applied on another speciel type, such that the former performs only as a skin to the latter, but does not alter the function of the covered speciel space; for example, Caesar's Palace (a hotel and casino) in Las Vegas, Nevada. This example also illustrates a specific example of Appliqué called Pastiche, where spatial components and arrangements willfully replicate a specific original built environment.

Bricolage is the *recognizable* use of spatial components—specific discrete and quantifiable elements—that are associated with one type of speciel but used in another unrelated speciel typology. Usually, *bricolage* components are produced for one specimen but employed in another, incorporated over time (gradually) and as the result of an *ad hoc* solution to an immediate problem. For example *spolia*: spatial components removed from an original site, and re-used in a completely different function in its new context. Interestingly, the production of *bricolage* speciel components in a current specimen may generate an entirely new speciel type thereafter as spatial producers replicate or emulate the specimen going forward.

Speciel convergence: When two distinct cultures, completely independently from each other (time and/or place), produce a *similar form* because of the same functional demand.

Speciel accidentality: When two distinct cultures produce a *similar form* that do not function in the same way in the context of each socio-cultural environment.

SPATIAL TAXA

Finally, following a biology-based taxonomy, is the proposal for a meta-descriptive language that ranks general categories. As mentioned at the beginning of this text, a deductive (general to specific) classification approach requires that each successive taxa be sorted by increasingly stringent intrinsic qualities of the selected group. The proposed spatial taxonomic nomenclature emulates—but does not replicate—the biological taxa schema of the Domain-Species system. The most inclusive,

TABLE 1. TAXA (SAMPLE SPATIAL PHYLOGENY IN ITALICS FOR TEMPLO MAYOR):

RANK	NAMES/EXAMPLES
All Space	*Omnikhôra*
Domain	*Anthropokhôra*, Xenokhôra, Physis
Expression	*Edifice*, Intuitive, Landscape…
Geography	*Mesoamerica*, Mesopotamia, Western Andes…
Culture	*Aztec*, Huichol, Mestizo, Olmec…
Period	*Pre-Hispanic* 1200-1521, Early Conquest, Tula Formative…
Function	*Religious Ritual,* Palace, Fortification, Administrative, Storage…
Speciel	*Pyramid Temple (Teocalli),* Altars, Hilltop Temple, Burial Chamber…
Specimen	*Templo Mayor* (Tenochtitlan), Templo de Huichilopotzli, Templo de Tlaloc…

and hence largest taxon, recognizes that "space" exists. Named *Omnikhôra*[27] it encompasses all space. It includes the domains of i) the human produced space, *Anthropokhôra*; ii) the non-human produced space, Xenokhôra[28], and iii) Physis, the *natural* world.[29'30] Anthropokhôra requires an ontological exploration that is beyond the scope of this paper, but it includes all human-*produced* space that is perceived as real (within the *absolute*) and mentally constructed space (i.e., imagination). In the case of real space, Anthropokhôra is cognitively perceived as a spatial experience via our senses, primarily proprioception, sight, touch, sound, and balance; to a lesser extent smell.[31] Conversely, imagined space is an inward looking, mentally constructed, *intuitive* experience that relies on our representation of spatial relationships, normally derived from lived experience.[32]

Thereafter, the taxon *expression* separates different groups in terms of the spatial product—the object or objects—in its largest appearance in the built and mentally[33] constructed environment. *Geography*, the next taxon, is so named because it identifies the relationships between

> where things are found and why they are present in those places; how things that are located in the same or distant places influence one another over time; and why places and the people who live in them develop and change in particular ways.[34]

Knowledge encompassed by *geography* separates groups by commonality matrix of location, biome, topography, climate and the human response to these. The next rank, *culture*, incorporates socio-cultural selection criteria, e.g., "Aztec." It is important to note that determining and naming the socio-cultural group requires in itself rigorous ethnographic criteria as well general agreement on their associated behaviors. *Period*, the next taxon, establishes a specific time span. It is possible to establish the *period* not only by calendar dates (i.e., 1914-1918), but by a named historic period nomenclature, e.g., "The Renaissance." The second to last taxon, function, is based on Aristotle's "final cause" and is "the end, that for the sake of which a thing is done."[35] In the context of spatial production, it is the primary reason—the "why"—that a space is produced. The final taxon, *speciel*, requires that 1) all specimens share the same *phylogenetic* criteria, and 2) because of common traits, are *biospeciel* (from biospecies), that is, produced by the same sociocultural entity. Specimens are specific examples of a speciel type. Table 1 shows a proposed taxa hierarchy:

CONCLUSION

The above proposal for a spatial taxonomic language is not yet exhaustive: rather, it serves as an initial attempt to reify a design approach based on the classification of spatial typologies. As the built environment increasingly becomes homogenized, spatial producers, particularly designers (architects, landscape

architects, planners, etc.) who seek to preserve or augment the uniqueness of place, will continue to seek context-based typological design. There exists a long history of identifying typologies, and the cultures associated with their production. While intuition or case-by-case object analysis (precedent studies) will always be a fruitful educational endeavor, it has—for the most part— lacked scientific rigor. This paper is a first attempt to establish an analytical language for spatial typologies. As historians, designers, neighbors, engage in *placemaking* through the production of space, these analytical tools help continue phylogenetic spatial traditions that reinforce place-based uniqueness.

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26. Italics mine. William Rowe and V. Schelling, p.231
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28. Anthropo+khôra: human+space, Greek ἄνθρωπος + χώρα; Xeno+khôra: foreign+space, Greek ξένο+χώρα.
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30. The difference between Omnikhôra and Physis has important implications beyond the scope of this paper, but will be explored in another iteration.
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