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## Clarifying and Evaluating Alexander’s Theory of Wholeness by Interpreting his Approach as a Tetrad of Activity

David Seamon  
Architecture Department  
211 Seaton Hall  
Kansas State University  
Manhattan, KS 66506-2901  
[triad@ksu.edu](mailto:triad@ksu.edu)  
[www.arch.ksu.edu/seamon/](http://www.arch.ksu.edu/seamon/)

Since the late 1960s, architect Christopher Alexander (1975, 1977, 1979, 1981, 1985, 1987, 1993, 1995, 2002-05) has sought to understand and make happen self-consciously a particular kind of order he calls *wholeness*, which, whether in nature or human-made, is the “source of coherence in any part of the world” (*Nature of Order* [hereafter *NO*], vol. 1, p. 90). When well done, says Alexander, this coherence offers a sense of harmony, which “fills and touches us” (*ibid.*, p. 15). More so, wherever there is wholeness, there is *life*, which involves such qualities as good health (e.g., a flourishing wetland), enjoyment (e.g., a robust urban neighborhood with a bustling street life), handsomeness (e.g., a well crafted door), or beauty (e.g., an elegant glazed bowl, a fine oil painting, a splendid soaring cathedral).

In his four-volume *The Nature of Order*, Alexander presents an approach and process that he claims might facilitate wholeness, whether in art, decorative objects, buildings, or entire places. Alexander’s means for understanding and making wholeness are twofold: first, a set of fifteen structural properties that he claims reoccur in all things, buildings, places, and situations that evoke wholeness and life (table 1); second, a step-by-step method of making whereby each stage in the design of a particular project becomes a pointer for what is to come next through the recognition, guided in part by the fifteen principles, of creating more and more centeredness, density, order, and life. His means toward this end are a series of ten structure-enhancing actions that he claims will always intensify the life and wholeness of the thing made (table 2).

Table 1

Alexander's 15 properties of wholeness	
• Levels of scale	• Contrast
• Strong centers	• Gradients
• Boundaries	• Roughness
• Alternating repetition	• Echoes
• Positive space	• The void
• Good shape	• Simplicity & inner calm
• Local symmetries	• Not separateness
• Deep interlock & ambiguity	

Table 2

Alexander's 10 structure-enhancing actions	
1. Step-by-step adaptation.	7. Evoking & being guided by a deep feeling of whole.
2. Each step helping to enhance the whole.	8. Finding coherent geometric order.
3. Always making centers.	9. Establishing a form language that rises from & shapes thing being made.
4. Allowing steps to unfold in the most fitting order.	10. Always striving for simplicity by which thing becomes more coherent & pure.
5. Creating uniqueness everywhere.	
6. Working to understand needs of clients & users.	

Because Alexander's argument for wholeness in *The Nature of Order* is so complex and multifaceted, I attempt in this presentation to lay out a simplified but comprehensive portrayal of what exactly are its conceptual and practical heart and thrust, drawing occasionally on *Nature of Order* but relying mostly on *A New Theory of Urban Design* (Alexander 1987), published in 1987 and his first public account of the structural principle of *centers*, which becomes a pivotal concept and aim in *Nature of Order*. I take this tack because *Nature of Order* is so wide-ranging in its theoretical and practical parts that, ironically, one can readily lose sight of the work's whole. By focusing on one of Alexander's real-world interests and efforts—remaking a strong sense of place in the American city—one can perhaps more readily locate the central dimensions of Alexander's theory of wholeness and better understand and remember that the theory itself seeks to be whole in both its conceptual and applied possibilities.

## **A Systematics of Alexander’s Theory of Wholeness**

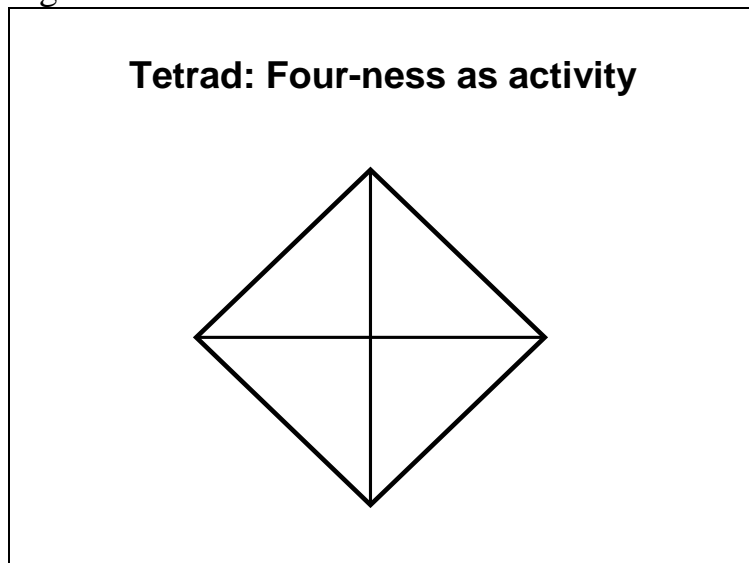
To locate precisely the conceptual and practical heart and thrust of Alexander’s theory of wholeness, I draw on the work of English philosopher J. G. Bennett (1897-1974), who sought in his four-volume masterwork *The Dramatic Universe* (Bennett 1956-1966) to develop a conceptual method—what he called “systematics”—to clarify pattern and order by drawing upon the qualitative significance of number (also see Bennett 1993).

In his effort to find a way to identify and to understand the underlying pattern and structure of a particular “thing”—be it an object, action, relationship, situation, process, or whatever—Bennett turned to the experienced quality of number; thus he argued, for example, that the qualitative meaning of one-ness relates to the particular whole in which one is concerned, while the qualitative meaning of two-ness relates to the various differences, polarities, and complementarities present in the whole. Yet again, three-ness helps to define relationship and reconciliation, while four-ness helps to define activity; five-ness, significance and potential; and so forth (Bennett 1966, chap. 37; 1993).

### **Alexander’s Theory as Tetrad**

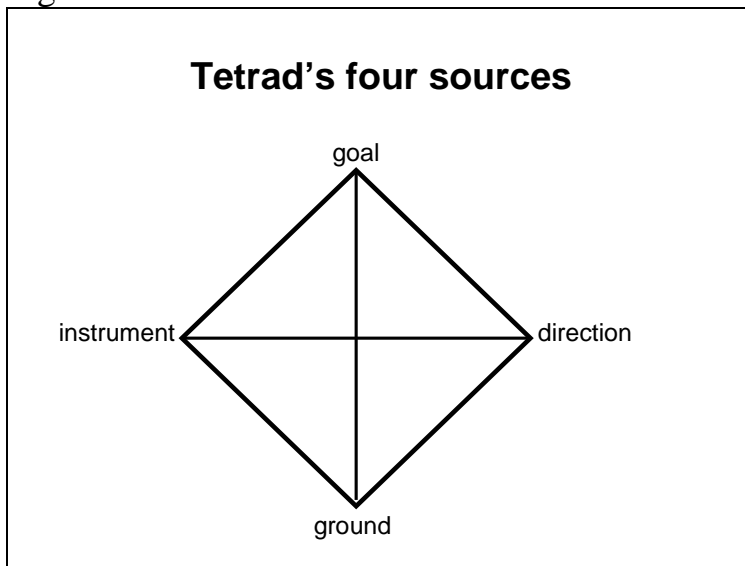
In examining Alexander’s theory of wholeness, I focus on Bennett’s fourth-order system, or *tetrad*, which he represents as a cross-filled diamond as shown in figure 1. Bennett claims that the four-ness of the tetrad helps to answer the question, “What is happening and why?” and thus lays out the aspects of any intentional and directed activity, which in Alexander’s case relates most broadly to making as a process of creating coherence, order, and life, whether one speaks of an object, building, place, or some other made thing.

Figure 1



Bennett calls the four aspects of the tetrad *sources*, which he designates by the words *ground*, *direction*, *instrument*, and *goal* and places accordingly on the diamond-shaped tetrad symbol as shown in figure 2. To what do each of these sources refer to in relation to any activity? The *ground* is the relatively formless raw material with which any activity must work, while the *goal* is the aim of the activity and the ideal end or result. In turn, the *direction* is the driving qualities and understandings through which the goal might be fulfilled, while the *instrument* is the inner workings of the activity through which the driving qualities and understandings are moved forward practically.

Figure 2

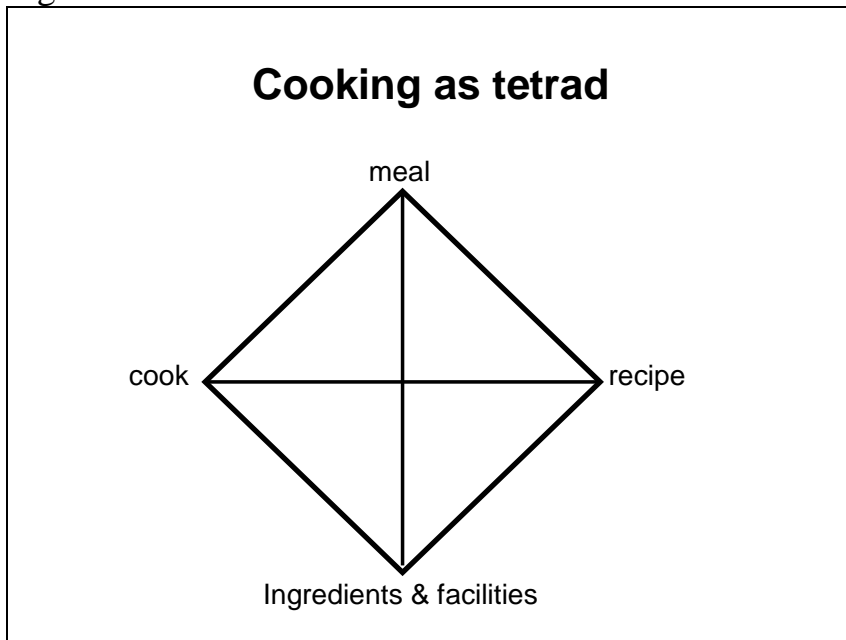


In studying the completed tetrad (figure 2), one realizes that the vertical line connecting ground and goal is related to the “ends” of the activity in that the need for the ground to become more ordered and complete is present ideally in the goal, which in turn provides the vision and aspiration for an actualization of order and completion potentially possible for the ground. If the vertical line relates to “ends,” the horizontal line signifies the conceptual and practical “means” whereby the transformation from ground to goal might unfold in a particular situation through the particular knowledge, skill, and practices of the parties involved (instrument) as they draw on some set of plans or guidelines as they help guide the process temporally (direction).

A simple example of the tetrad is the activity of cooking a meal, which is illustrated in figure 3. Ideally, the aim, using raw ingredients and cooking facilities (ground), is an enjoyable dining experience (goal), which comes into being through a cook (instrument) making use of a recipe (direction). Though this activity is basic to human life, one should note that qualitative variations in each of the sources—for example, freshness of the raw ingredients, degree of order in the kitchen, relative experience of the cook, quality of the

recipe, and so forth—all contribute to whether the meal will be inedible, ordinary, or a refined gastronomic experience. For the highly-skilled chef, the activity of cooking has become so honed and secondhand that he may spurn recipes and make food preparation seem effortless. On the other hand, a beginning cook may have so little experience that, even though he aims for an exceptional meal, the result is barely passable. The larger point is that there can be wide variations in each of the four sources, in the relationships among them, and in the resulting activity or end product.

Figure 3



### **Alexander's *New Theory of Urban Design***

To illustrate the application of Bennett's tetrad to Alexander's theory of wholeness, I turn to his *New Theory of Urban Design* (Alexander 1987), which is his effort to suggest a way to return wholeness, vitality, and health to the American city, which he sees as currently chaotic, dehumanizing, and placeless. In this book, he offers seven *rules*, as he calls them, which he believes might provide a healing action for the city and lead to a renewed sense of place. These rules are summarized in table 3.

Table 3

Alexander's seven rules:

1. Piecemeal growth
2. The growth of larger wholes
3. Visions
4. Positive outdoor space
5. Layout of buildings
6. Construction details
7. Formation of centers

For example, rule 1—"piecemeal growth"—says that the best construction increments are small, thus, in any attempt to strengthen the city or its districts, there should be an even mix of small, medium, and large construction projects. Building on rule 1, rule 2—"the growth of larger wholes"—directs how specific design projects can be seen to belong together and therefore requires that "every building increment must be chosen, placed, planned, formed, and given its details in such a way as to increase the number of wholes that exist in space"(Alexander, 1987, p 248).

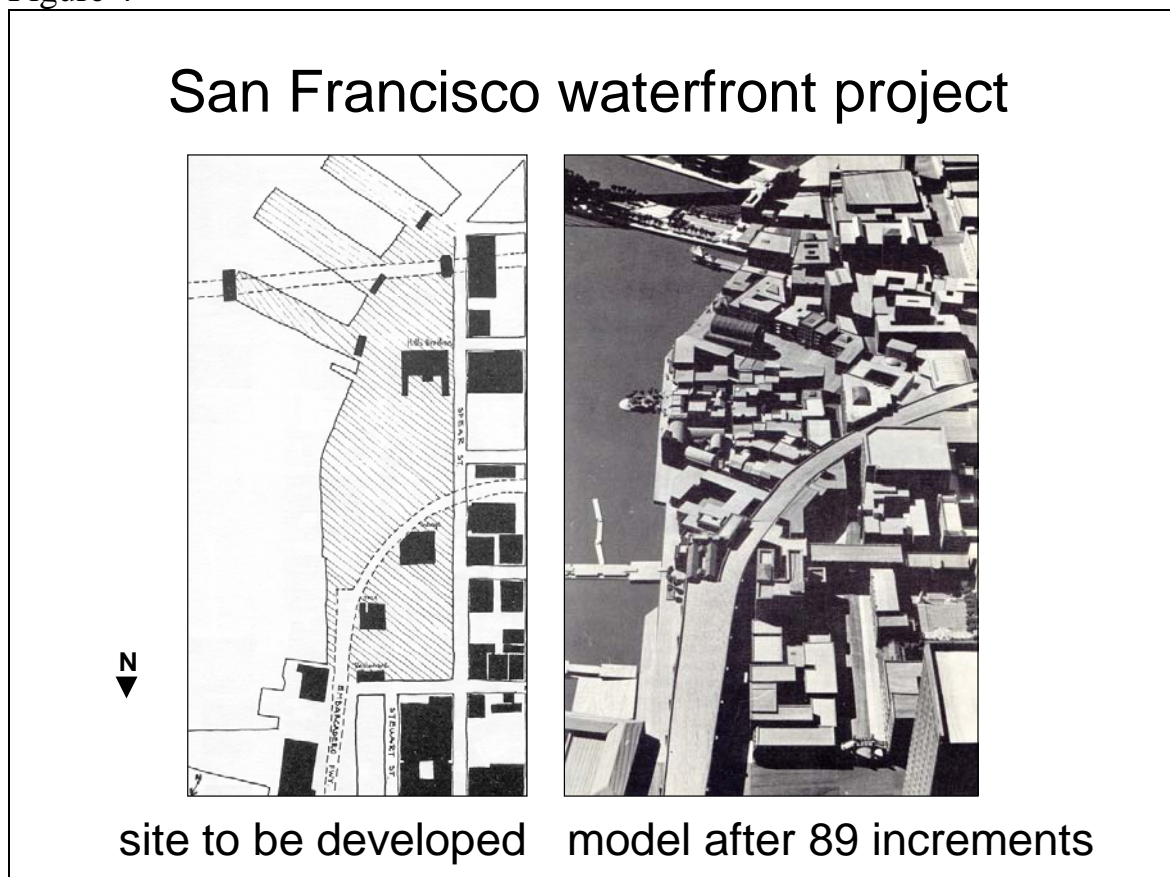
Of these seven rules, the most pivotal is the last—*formation of centers*—which, in Alexander's work beginning with *New Theory*, becomes the primary conceptual and practical means for clarifying and extending his earlier "pattern language" ideas (Alexander 1993, 1995, 2003). Most simply, a center is any sort of spatial concentration or organized focus or place of more intense pattern or activity—for example, a handsomely designed window, a well placed kiosk, an elegant arcade, a welcoming building, a lively plaza full of people enjoying themselves, or an entire city neighborhood that is well liked and cared for (see especially Alexander 2003, chap. 3).

Whatever its particular nature and scale, a center is a region of more intense physical and experiential order that provides for the relatedness of things, people, situations, and events. In this sense, the strongest centers gather the parts in a relationship of *belonging*, including city dwellers. Further, where one finds life and wholeness in the city, centers are never alone but mutually implicated at many levels of scale: "The wholeness of any portion of the world is the system of larger and smaller centers, in their connections and overlap" (ibid., pp. 90-91).

## San Francisco Waterfront as an Experimental Context

Alexander illustrates the use of his seven rules through a simulation experiment conducted with architectural graduate students at the University of California at Berkeley in a design studio taught by him and colleagues Ingrid King and Howard Davis. The nineteen students in the studio focused on thirty acres of the San Francisco waterfront just north of the Bay Bridge and destined for development (figure 4, left). The major task was to transform these thirty acres, mostly empty, into a district of buildings, streets, plazas and parks that would all contribute to a sense of life, atmosphere, and wholeness. Eventually, the students converted the waterfront site into a set of places that included a pedestrian mall, a main square, a waterfront park, a market, and fishing pier (figure 4, right).

Figure 4



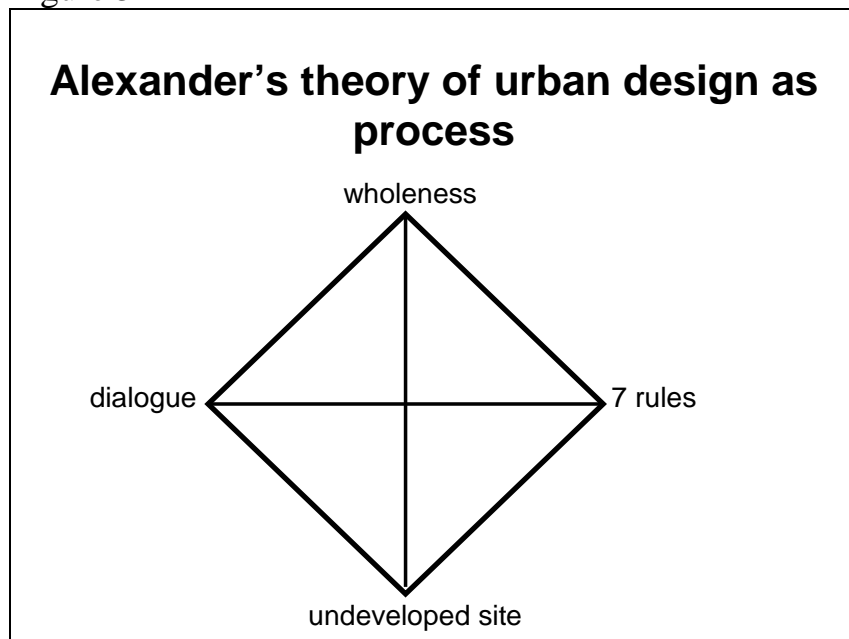
As the main means to develop this design scheme over time, the students in the studio were asked by Alexander to imagine themselves as developers, designers, and representatives of community groups. On the other hand, Alexander, King, and Davis took the role of an evaluation committee responsible for guiding the growth process. No student's design idea (what Alexander calls, in rule 3, "vision") could be finalized until the committee had evaluated the idea and considered strengths and weaknesses. All faculty and students were

involved in all discussions about every project, so at least theoretically there was much mutual understanding as to the project's progress and ultimate aim.

### **A Tetrad of New Theory**

How can Alexander's theory of urban design be understood in light of Bennett's tetrad? As shown in figure 5, I call the tetrad "Alexander's Approach to Urban Design," and identify its four sources as *site*, *wholeness*, *rules*, and *dialogue*. The *ground* of Alexander's design process is the thirty-acre *site*, which is without order and in need of development. The *goal* for the site is *wholeness*, which for the waterfront district would ideally include a coherence, robustness, and unique sense of place. The *direction* for the actualization of wholeness is Alexander's seven *rules*, through which the participants in the design process gain understanding and the waterfront gains realization. These rules are set in motion through the *instrument* of students and teachers, who role-play a developer/committee relationship founded in *dialogue*—in other words, continual group awareness as to who is planning and designing what, where, and when and how each increment potentially contributes to the wholeness of place.

Figure 5



How well does Alexander's approach to urban design work? Bennett argues that one way to consider this question is to examine the six lines joining the four sources of the tetrad. These lines, says Bennett, indicate that the four sources "are never separate but *interconnected and influencing each other*" (Bennett 1993, p. 69). First, there is the lower, right-hand link between *site* and *rules*, which speaks to the hope that development will maintain the site's basic integrity even as the rules give guidance to ways in which that basic integrity can be

enhanced and made more coherent and alive. Second, there is the lower, left-hand link between *site* and *dialogue*. In Alexander's approach, the hope here is that the students' unrefined perceptions of the site are given creative formation through a vision in touch with what the site is and how in any stage of the process it has been developed so far.

Does the final waterfront design maintain the integrity of the San Francisco site, yet use that integrity as the basis for creative design, drawing on the potential of rules and dialogue? One must answer both yes and no. Aspects of the design that seem to respect the site include the pedestrian mall and the many increments—for example, the fishing pier, the waterfront park, the boat-repair area—that draw on the proximity of the site to water. On the other hand, there are increments that seem less in character with the site—for example, the buildings along the expressway (how to deal with noise and pollution?) and the grid of streets (is a rectilinear pattern really appropriate for the site's waterfront character?). There is also the larger practical question of whether the site could be economically viable with the land uses proposed by the waterfront design.

Turning to the upper half of the tetrad, one can consider, first, the upper, right-hand line between *rules* and *wholeness*, which relates to the transformation of the rules into an actual environment with a strong sense of place. Second, there is the upper, left-hand line between *dialogue* and *wholeness*, which relates to the faculty and students' participation in the design process and their collective success in evoking order, rightness, and place identity for the site.

How well did the rules transcribe themselves into an actual sense of place wholeness? Again, there is both success and failure. On one hand, as compared to the arbitrariness of most conventional urban planning and design, the waterfront scheme is clearly superior because it has a sense of human scale and relaxed informality. On the other hand, the final design is weak in terms of individual buildings that often lack a sense of unity and have the appearance of "a late nineteenth-century pseudo-renaissance style of architecture" (Alexander 1987, p. 235). Still, the completed design evokes a certain crispness and feeling of innovation; one senses that, with some projects, the students experienced moments of genuine insight and vision sympathetic to the site. In this sense, there were moments in the design process when the relationship between dialogue and wholeness worked in a real and powerful way—a situation that offers much hope for design education and practice modeled after Alexander's approach.

Finally, there are the tetrad's vertical and horizontal links between *site/wholeness* and *rules/dialogue*. As already indicated, the line between *site* and *wholeness* relates to the realization of the site as a more coherent, robust place, while the line between *rules* and *dialogue* relates to the growing understanding of students and faculty, especially in regard to

how the rules might be refined to make the design process more effective in generating wholeness.

One of the most encouraging aspects of Alexander's experiment is that the students' designs over time appear to have improved as they had practice with the rules and were able to work with them more fluidly and creatively. At the same time, the simulation refined Alexander's own sense of the seven rules and leads him to emphasize, in the evaluation of the experiment in the book's final section, that the rules regarding wholeness need further refinement so that increments will be more in touch with the larger whole and, therefore, have a more organic, unself-conscious quality. Throughout the book, Alexander emphasizes that he is not entirely satisfied with these rules. He says that they are not formulated precisely enough with the final result that waterfront design is "too much an aggregate of parts, not a single well-formed whole" (ibid., p. 237).

### **Intensifying Wholeness?**

Because of his emphasis on wholeness, the most significant question about Alexander's approach is the line linking *site* and *wholeness*. Did the waterfront site experience healing, and was it transformed into a place of considerable order and life? As I've already suggested, the final design has a variety and vigor not typically found in conventional urban planning. As Alexander says—I think correctly—the design has "the organic, personal, and human character which we associate with many of the most beautiful cities of the past, and which seems to be responsible for their success as environments. And it clearly does *not* have the obsessive, dead character of most 'urban design' projects of recent decades" (ibid., p. 234).

At the same time, Alexander admits in his evaluation that the design has many problems, and he emphasizes that the greatest weakness is that the project does not have a strong enough sense of order at the largest scale (ibid., p. 236). He is particularly displeased with the Main Square, since it was to be the heart of the whole site. He feels that the Main Square and its immediate surroundings offer some sense of order, but this order does not project itself into the other parts of the site. He says that if the theory were perfect, it would not only have produced a main square somewhere near the center, but would also have produced a

Field-like gradient, which could be felt throughout the project, in which every part of the project would "point" toward the main square. Thus, somehow, the whole project would have a physical structure showing a kind of centralized gradient, all of its sloping (metaphorically) towards the middle (ibid., p. 237).

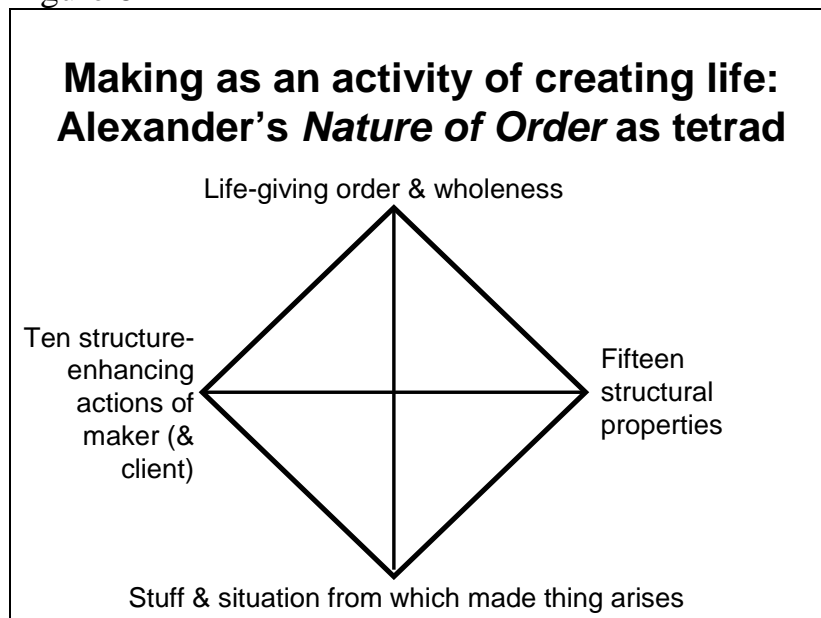
In regard to the link between *site* and *wholeness*, there is the more significant issue of whether the process could ever be used successfully in the real world of actual urban place

making—in short, its real-world practicality. How could Alexander’s approach to urban design ever be implemented in a real-world community of residents, businesspeople, politicians, administrators, and general public, whose criteria for success vary greatly and are often much different from the quest for wholeness that is Alexander’s central aim? He makes this dilemma a strength by pointing out that his emphasis on wholeness leads to “an entirely different effect from current practice in urban design, and goes far to remedy the defects which cities have today” (ibid., p. 249). His hope is that a committed, funded community with the necessary material and psychological resources might someday apply his approach to a real-world site and see what kind of community and place might evolve.

### **A Tetrad of *Nature of Order***

Finally, let me make some brief comments as to whether the tetrad generated here for the less complicated context of *New Theory* might be generalized to the much more multifaceted argument of *Nature of Order*. In thinking through *Nature of Order* as a tetrad, I arrive at the four sources illustrated in figure 6: ground as *stuff and situation from which the made thing arises*; direction as the fifteen *structural properties*; instrument as the ten *structure-enhancing actions* of maker and client (if there is a client); and aim as *life-giving order and wholeness*.

Figure 6



In one sense, three of the four volumes of *Nature of Order* can be interpreted as laying out three of the four sources of this tetrad in that volume 1 deals largely with an explication of the fifteen structural properties (indicated by the volume’s title *The Phenomenon of Life*); volume 2 lays out the ten structure-enhancing actions (indicated by the volume’s title *The*

*Process of Creating Life*) ; and volume 4 points toward the ontological and metaphysical grounds of life-giving order and wholeness (indicated by the volume's title *The Luminous Ground*). Volume 3 might be said to illustrate the entire tetrad in that Alexander demonstrates how he uses the generative process laid out in volumes 1 and 2 to create life-enhancing things, buildings, and places.

As I suggested at the start of this presentation, perhaps the greatest weakness of *Nature of Order* is its attempt to be both in-depth and comprehensive—in-depth, in terms of defining a set of actions that will work for any process of making, whether creating an art work, decorative object, building, or entire place; comprehensive, in terms of providing evidence of made things at all levels of environmental and architectural scale—from neighborhood and public space through buildings, rooms, construction and ornamental details—even works of art and decorative art. It is not really clear whether the fifteen structural properties have the power to facilitate, at such a broad range of material scale, the kind of clear understanding offered by Alexander's earlier pattern language or the seven rules of *New Theory*; nor, like the unfocused nature of the dialogue process in *New Theory*, is it clear that the ten structure-enhancing actions have the practicality or resilience to really move the making process in such a way that it evolves toward the life-giving order and wholeness that Alexander cherishes.

On the other hand, one could argue that the depth and comprehensiveness of *Nature of Order* is its strength in that it demonstrates—at least partly successfully—that any kind of material creating is essentially the same: facilitating a multi-staged making grounded in a shared understanding of basic principles and properties and leading to a made thing—whether art work, artifact, built environment, or place—that evokes well being, belonging, wholeness, and life.

### **Built Work as Life-Sustaining Wholeness?**

In this regard, I want to end by asking whether the built work Alexander presents in volume 3 of *Nature of Order* manifests the life-sustaining wholeness that he advocates. Broadly, the answer is both yes and no. Some of his projects, especially many of the houses, seem awkward, roughly constructed, and second rate. On the other hand, there are a good number of buildings and other made projects that, in various ways, evoke the sense of clarity, dignity, and life for which Alexander strives. Perhaps the most powerful example is England's West Dean Visitor's Centre, a building that, both inside and out, appears to be striking architecture, expressing a serene stateliness and grace shaped by careful site placement, a simple, majestic form, and handsomely-integrated materials like brick, stone, and concrete. This building is probably the single best work presented in *The Nature of Order* and a telling example of what a life-enhancing architecture might be.

These and other built projects presented in *The Nature of Order* demonstrate that Alexander's approach to making can have effective, practical results and is feasible for a wide range of situations, clients, and building types. Ultimately, however, he would not wish to be judged on his finished projects alone. Rather, he sees each of these projects as an experiment—as another opportunity to figure out and refine a way of learning and making that can generate order and life.

Here lies Alexander's unique contribution: his ceaseless effort to understand order-invoking process and, through that understanding, to help the world become more coherent and alive. Alexander defies categories: he is a thinker and designer, scientist and artist, philosopher and builder. He realizes that, if we are to really know and shape our world in a better way, we must find a radically new means of looking, understanding, and making. Without a doubt, *The Nature of Order* demonstrates the remarkable progress he has made toward this arduous and nearly impossible aim.

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