This issue of *EAP* begins our 18th year. We thank the 72 readers who have renewed their subscriptions and include reminders for "delinquents."

The essays in this issue focus on the work of architect and thinker Christopher Alexander, particularly the ideas in his recent four-volume *The Nature of Order* (see *EAP*, winter 2002 & fall 2006 for reviews). In her essay, Jenny Quillien, who assisted with the editing of *Nature of Order,* explores commonalities and differences between Alexander's earlier "pattern language" work and his more recent effort to identify and generate transformation-creating sequences. Quillien examines some ways in which Alexander's innovative approach to design might be more readily understood and applied, not only by professionals and academics but also by laypeople.

We are grateful to Christopher Alexander for contributing the issue's second essay, in which he overviews the major discoveries and conclusions in *The Nature of Order*. One criticism of the work has been its overwhelming scope and thoroughness. Alexander's "summary" may be a useful starting point for newcomers to organize his overall vision and to better understand the impressive ways in which the work's many themes mark out an integrated whole that might do much to foster life-enhancing things, buildings, and places. Note we have shifted the layout of the essay from two columns to one to help Alexander's argument read as clearly as possible.

Right: Sketches from volume 2 of Christopher Alexander's The Nature of Order: The Process of Creating Life *(p. 280). These drawings schematize a design process involving what Alexander now calls "wholeness-extending transformations." See p.14.*

Step 1: Beginning with a symmetrical cell of space, which is a simple "center"—i.e., a concentration and intensification of order.

Step 2: Strengthening the 1st center by intensifying its axial quality with an apse "head"—a 2nd center.

Step 3: Adding bottom and side centers.

Step 4: Evoking a sense of gradient by creating a boundary that incorporates the centers of step 3 (niches, alcoves, "places where something might grow").

Step 5: Embedding the original center in a field of other centers so the building connects with its surroundings. This center "gets its life most strongly... because it disappears."
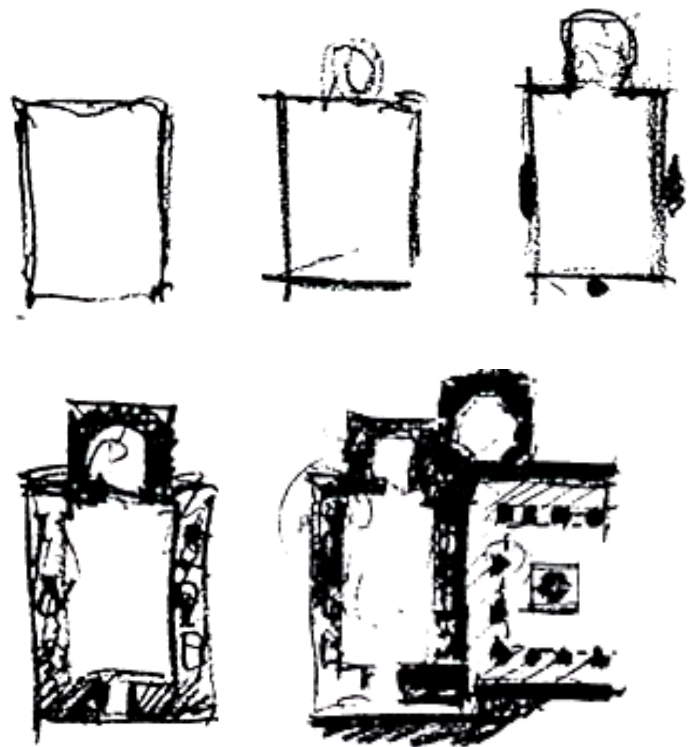
Donors, 2007

We are grateful to the following readers who have contributed more than the base subscription for 2007. As always, we could not continue without your generous support, and we thank you all!

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Presenters Needed for EAP Session at Chicago IAEP!

As announced in the fall issue of *EAP*, the 2007 meeting of the International Association for Environmental Philosophy (IAEP) will be held in Chicago, 10-12 November, immediately following the annual meetings of SPEP (Society for Phenomenology and Existential Philosophy) and SPHS (Society for Phenomenology and the Human Sciences). Representing *EAP,* David Seamon has been asked to organize a double session of conference papers on Monday morning, November 12, 9 am-12:30 pm.

The theme of the double session will be "Phenomenological Approaches to Place and Environment." Seamon asks that anyone interested in presenting a paper contact him *immediately,* since proposals, in the form of 1-2-page abstracts, are due 1 March 2007, thus Seamon will need them by *February 25, at the latest.* triad@ksu.edu.

Last year's Philadelphia IAEP/*EAP* sessions focused on Christopher Alexander's work (see Jenny Quillien's essay, this issue). Presentations were well attended and generated lively, constructive discussion. *Please consider participating!*

For more on IAEP and the Chicago conference, go to: www.environmentalphilosophy.org.

EDRA Conference

The annual Environmental Design Research Association (EDRA) conference will be held in Sacramento, CA, 30 May-June 3, 2007. Keynote speaker will be architect Sim Van der Ryn. *EAP* editor David Seamon has organized a symposium on the work of Christopher Alexander. Presenters will be Gary Coates, Kyriakos Pontikis, Doug Paterson, and Seamon. Susan Ingham and Karen Kho will provide commentaries. www.edra.org/

Items of Interest

The **Building Process Alliance** is an international organization of architects, designers, builders, planners, researchers and educators committed to building places of enduring comfort, joy, and human value. The group was founded in 2005 by former colleagues and students of architect Christopher Alexander. Efforts of BPA build upon this common foundation and also explore new processes and approaches to creating wholeness and living structures in the built world. The aim is to create order in the built environment by making places that are both comfortable and beautiful.
www.buildingprocessalliance.com/

Duquesne University's Simon Silverman Phenomenology Center in Pittsburgh announces the following conferences. **Phenomenology and Critical Theory** will be held 16-17 March. **Built Spaces: Earth, Sky and Human Praxes**, the 3rd annual conference of the International Association for the Study of Environment, Spaces, and Place, will be held 27-29 April. www.towson.edu/iasesp; www.duq.edu/phenomenologycenter.

News from Readers

Inger Birkeland is a Norwegian geographer working as a postdoctoral research fellow at the Department of Geography at the University of Bergen. She is author of *Making Place, Making Self: Travel, Subjectivity and Sexual Difference* (Ashgate, 2005).

She currently is carrying out a research project on place planning and community building in a local municipality in Norway.

She writes: "I work with a phenomenological approach to place, describing it as a community and interplay between people, society and nature. I think place is undervalued as a tool for creating more just and sustainable societies that cares for the interests and needs of both people, nature and society.

"You can see the presentation of the project on www.chora.no. I have for years been interested in the relationship between self and place from an (eco/geo) feminist point of view and argue in my book that we might understand the self as a geographical place, and place as a geographical self.

Architect and builder **Mark A. Miller** is involved in research for creating a new design for the archetype of contemporary "memorial gardens." He writes: "For decades, people's comfort level with the subject of death and dying has been changing, less involving fear and taboo less and more involving understanding, wholeness, comfort and compassion.

"I am interested in 'updating' the design of memorial gardens to reflect a sacred place celebrating the joyful spirit of loved ones who have passed. Since having children, I have asked myself what would be the context that would best connect with, respect, and honor the spirit of these loved ones.

"I would appreciate any knowledge, insight, and contacts that EAP members would be willing to share." mark@zenplusarchitecture.com; 7235 N. Sheridan Road, Chicago, IL 60626.

Citations Received

Paul C. Adams, 2005. *The Boundless Self.* Syracuse, NY: Syracuse University Press.

Using as his subtitle, "Communications in Physical and Virtual Spaces," this geographer argues that "through communication, not only do we surpass the physical body and become inextricably linked to a network of communicators…, but also at the same time we redefine and rework our ties to the physical world. As nodes in a network of human actors that persist through time… we are both *extensible* and *grounded* in a complex, four-dimensional world. We are ontologically embedded in the world in a way that includes subjective, objective, and intersubjective domains of meaning." Includes a useful section criticizing postmodernist, poststructural, and critical social-science research.

Barry Blesser & Linda-Ruth Salter, 2006. *Spaces Speak, Are You Listening? Experiencing Aural Architecture.* Cambridge: MIT Press.

An examination of what the authors call "auditory spatial awareness: experiencing space by attentive listening." Examples include prehistoric cave paintings, classical Greek open-air theaters, Gothic cathedrals, acoustic geography of French villages, modern music reproduction, and virtual spaces in home theaters. "Some listeners can learn to 'see' objects with their ears, but even without training, we can all hear spatial geometry such as an open door or low ceiling."

Emily Brady, 2003. *Aesthetics of the Natural Environment.* Tuscaloosa: University of Alabama Press.

This philosopher "explores critically central topics in the growing field of environmental aesthetics" and develops what she calls an "integrated aesthetic," whereby she attempts to "find a balance between more subjective and more objective approaches to aesthetic appreciation."

Shelley Egoz, Jacky Bowring, & Harvey C. Perkins, 2006. Making a 'Mess' in the Countryside: Organic Farming and the Threats to Sense of Place. *Landscape Journal, 25* (1):54-66.

These authors argue that "organic farming practices… often result in landscapes that differ from those produced by the application of long-standing conventional land management systems. The resulting aesthetic poses a threat to the landscape tastes and a sense of place of conservative framing communities." Grounded in a "social-constructivist" perspective but reasonable real-world conclusions.

Tom Jay, 2006. *The Blossoms Are Ghosts at the Wedding.* Port Townsend, Washington: Empty Bowl.

A selection of poems and essays from writer and sculptor Tom Jay, whose lyrical pictures of human life and natural world, especially in the Pacific Northwest, are a kind of implicit, heartrending phenomenology of person, place, and region.

Dylan Trigg, 2006. *The Aesthetics of Decay: Nothingness, Nostalgia, and the Absence of Reason.* NY: Peter Lang.

This book argues that "the decline of reason enables a critique of progress to emerge…. The derelict factory, abandoned asylum, and urban alley become allies in Trigg's attack on a fixed image of temporality and progress."

Grasping the Ineffable:
From Patterns to Sequences

Jenny Quillien

Quillien teaches in the Laboratory of Anthropology, New Mexico University at Highlands, Santa Fe, New Mexico. She worked for six years with Christopher Alexander on his four-volume *The Nature of Order* and on the Pattern Language website (www.patternlanguage.com). An earlier version of this essay was presented as a paper for a special session on Alexander's work held in October, 2006, at the annual meetings of the International Association for Environmental Philosophy in Philadelphia. jenny@jqsolutions.org. © 2007 Jenny Quillien.

Many faithful readers of Christopher Alexander's *A Pattern Language* were disconcerted to discover that *The Nature of Order* was not its obvious sequel. *A Pattern Language* had afforded access to a well established and broadly pragmatic response to ordinary problems in the art of building. Now, nearly 30 years later, *The Nature of Order* confronts those readers with demanding material having few comforts of the user-friendly handbook style of the earlier work.

This article reviews one of the significant differences between *A Pattern Language* (*APL*) and *The Nature of Order (NO)* and explores the advantages of bridging the fundamental projects of these two works. The central theme reviewed here is that of *patterns* versus *sequences*.

Attributes of Patterns

APL is a compilation of architectural patterns (honed solutions to recurring problems), combinatory rules, and techniques for practical results. Key attributes of patterns include the following.

MINED

Working patterns are, in Richard Gabriel's expression, mined. Like diamonds, patterns are the result of many years of process. We don't make them—we find them, polish them, use them, and value them. Developing patterns from scratch and all in one go has proven to be extremely difficult.

MANAGEABLE CHUNKS OF INFORMATION

Whether large scale (e.g., pattern #3—*city country fingers)* or small scale (e.g., pattern #200—*open shelves),* each pattern is immediately graspable as a manageable chunk of information.

BUILT & SOCIAL OVERLAP

Building patterns are obviously correlated to social patterns. Consider an example such as the weaver in Libya (photograph below) who has constructed his own place of work—pattern #80 *(self-governing workshop).* Or consider patterns #133 *(staircase as stage)* or #139 *(farmhouse kitchen).*

NESTED HIERARCHIES OF SCALE

A hypertext structure supports selecting and combining patterns of different levels of scales into a coherent whole. Illustrated here is the simple example of *#159 (light on two sides of every room)* calling for overlapping patterns at the smaller scale (e.g., #192—*windows overlooking life)* and at the larger scale (e.g., #106—*positive outdoor space).*

PROCESS & RESULT

Patterns are written as mid-level abstractions and work as design constraints. Their concrete guidelines do not unduly limit the builder. Each pattern offers both a finished state (a verbal blueprint of the desired result) and a process description (a guide for action). The guides for action are simple and direct. More like origami, they are not difficult in the way that following a blueprint is difficult. The instructions allow for an infinite number of renditions.
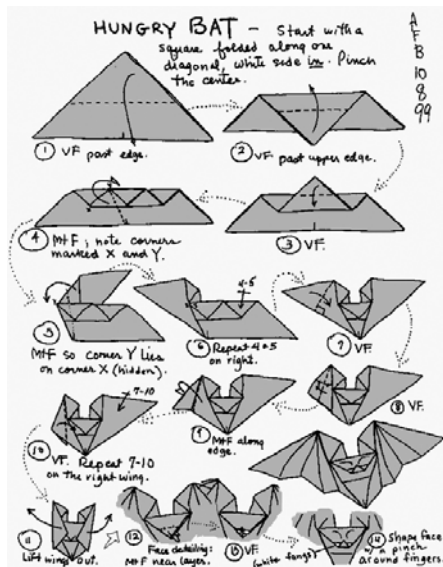
INFINITE CLUSTERS

Patterns are clusters of geometry. A pattern language is a coherent subset of patterns and combinatory rules that, like an individual pattern, can give birth to an infinite number of variations.

Below are three renditions of a simple traditional house form found on the Caribbean island of Aruba. The pattern language for this house type has not yet been explicated but would include such patterns as #127, *intimacy gradient* (these modest homes all have a small front room for visits from the local priest and for other 'formal' occasions, while the more intimate spaces are located toward the rear).

The pattern language for these houses would also include patterns not found in *APL*. For example, behind the front room are cooking facilities and access to a pattern that might be called *"winnowing breezeway."* The houses are placed so that their back give out onto a large working area, placed for maximum breezes.

COMPLEX OVERLAPS

Consider the streetscape from Sarlat, France, below. The potential for the subtle complex beauty of deeply organized spaces emerges from non-simple juxtapositions and overlaps of individual patterns. No doubt, this is the aspect of working with patterns that is the most difficult. It is also the aspect that has been the least elucidated in the writing about patterns and their implementation in the built world. It may also be one of the reasons why so many well-intentioned attempts at using patterns have resulted in rather mediocre spaces.

Attributes of Sequences

NO is a 'trail-blazing' intellectual work and a *tour de force*. Its goal is to understand the very nature of order and through this understanding bring us closer to grasping the ineffable life of beautifully built spaces. Creating profound spaces occurs largely through generative sequences. Key attributes of sequences include the following.

PROGRESSIVE DIFFERENTIATION

An Alexander doodle provides a simple example [see the five drawings on front page]. A sequence is the mindful ordering of decisions to be made. Decision n creates the context for decision $n+1$, which, in turn, creates the context for $n+2$. The net result of a building sequence is a progressive differentiation of space.

WHOLENESS AS GUIDE & GOAL

The process is recursive. At each decision point, we must grasp again the wholeness that exists to determine which next move will best call forth the latent structure.

EACH STAGE STRUCTURE-PRESERVING

The key is in getting the sequence of decisions right. For example, starting with the wholeness of a building site, understanding what to preserve and enhance will lead to initial decisions about where *not* to build. This is very different, say, from starting with engineering decisions about the most efficient layout for water and sewer pipes.

Recognizing a structure-preserving differentiation is intuitive but usually involves: (a) minimum symmetry breaking; (b) connecting to the next smaller and larger scale; (c) enhancing existing centers or creating new centers; and (d) transformation through one or more of the 15 geometric properties Alexander identifies in volume 1 (centers, boundaries, echoes, deep interlock, good shape, not-separateness, simplicity, and so forth) .

CENTERS BOOTSTRAPPING CENTERS

Structures that have 'unfolded' have a much higher density of connections and are therefore more robust than other structures. The whole and the part reinforce each other as centers are added and strengthened. For example, bones, the overall shape of which is often asymmetrical, are subtle, complex and very robust. A hipbone carries much of our weight and allows us to stand, walk, and sit. During growth, calcium is added according to the stresses placed upon the structure.
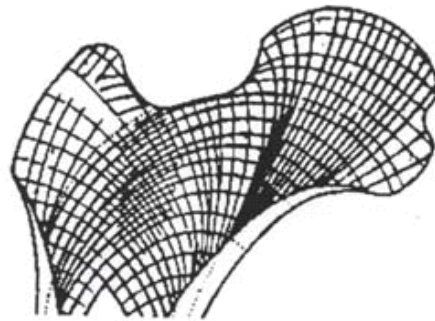
UNFOLDED FORMS

Morphogenesis and the mathematics of growth and structure preservation are not fully understood, yet we do intuitively distinguish unfolded forms from those that are not. Consider the two photographs, directly below, of unfolded streetscapes in Amsterdam, Holland, and Lawrence, Kansas. Compare them with the next two photos of streetscapes in Rotterdam and Aruba, below and right, where the buildings are not unfolded but are image-based and template-assembled.

SHAPE AS THE TRACE OF TIME

A plastic flower, no matter how clever its design and fabrication, cannot match the original. In a real daffodil, the form, subtle variations in color and texture, the infinite differences between that daffodil and all others in the same field are the consequences of growth and constant adaptation between parts and whole over time. This fine-grained complexity can be obtained in no other way. It is this particular quality that provides so much pleasure and wonder.

Bridging the Two Works

It would be "preaching to the choir" to argue the general importance of the built environment for our individual well being, our communities, and the health of the Earth. More to the point is the reaction of those who have now worked their way through the four volumes of *NO.*

Those who have read both *APL* and *NO,* in ways that are difficult to define, sense that sequences are more fecund than patterns. When we encounter profound spaces, the concepts of unfolding and wholeness offer more insights into our experiences of ineffable comfort than do problem-solution protocols. It

seems also possible that sequences might offer a deeper level of intervention when we strive to create profound spaces.

NO is unwieldy. Doing some absolutely necessary development work is an immediate first step to more fully adopting the advantages of sequences as real-world practice. Alexander himself would not disagree, having been involved some 30 years in the arduous task of constructing a logical chain of arguments as clearly as he could and looking to a new generation to carry the practical work forward.

What follows are some pragmatic proposals and questions to help develop the concepts sketched out in *NO*. Essentially, my suggestions are to take cues from *APL* and own up to a few hypocrisies.

A RETURN TO ETHNOGRAPHIC METHODS

Much of *APL's* richness is due to the ethnographic methods used to define *patterns*. These same methods of mining, documenting, and polishing could be used to compile a repertoire of *sequences* of *existing and successful building forms.*

As with *APL*, the first repertoire might consist of small, manageable sequences that represent intuitive chunks of information relating to social patterns. Maintaining a level of mid-level abstraction and writing sequences as recipes for action guarantees the potential for infinite renditions.

Readers of *APL* enjoy a multi-leveled use and can dip in piecemeal for individual patterns or simply to spur their own creativity. They can play with different pattern combinations to create their own language. They can approach *APL* from a meta-level of nested, problem-solution protocols as the computer programming community did so successfully. A repertoire of sequences for existing built forms might aspire to that level of achievement.

FRONT & BACK STAGE MAKING

Use of such sequences as "recipes" need require no more understanding of underlying phenomena such as geometric properties or implicate order than cookbook use requires scientific understanding of chemical reactions of ingredients under heat.

Preparation of the sequences as sets of instructions will eventually require extensive knowledge

and experimentation with the mathematics of growth, wholeness, force fields of centers, implicate order, the interactions of geometric properties, and so forth. This level of development work on sequences would surely bear fruit and take us beyond the useful but more mundane stage of pattern languages into the deeper realms of profound beauty, living structure, and *dwelling* in the sense that Heidegger used the term.

BLACK SHIRTS TO THE RESCUE

The patterns compiled in *APL* and the vast majority of examples used in *NO* are gleaned from centuries of "architecture without architects" and from cultures where those who built were those who dwelled.

In these cultures, knowledge of local patterns and the building skills of carpenters, roofers, masons, and other craftspeople were widespread. Small communities raised houses and barns with local materials and basic tools. This fusion is now largely lost, a fact constituting a major challenge. The average family today is clueless as to design and construction.

Although *APL* is still enthusiastically adopted by do-it-yourselfers and, although it is the basis for many charming remodeled homes, large-scale grassroots building based on pattern language has not taken place. Those few larger projects that were attempted all used intermediaries to steer the end-users and translate their desires into actions.

The ethos of Alexander's material is "bottom up," but 30 years of *APL* history show a reality of "top down" management and users who too readily defer to professionals. The New Urbanists, Alexander's philosophical neighbors, have been more successful in carrying out large-scale projects. Andres Duany, a founder of the New Urbanist movement, is less hypocritical about the loss of the connection between building and dwelling. Yes, he and his colleagues run charrettes with end users and other stakeholders. But these charrettes are always planted with what Duany calls his "black shirts"—trained experts who manage the interface between lay people and professionals.

It may be that progress for Alexander's approach will also require such intermediaries—practitioners,

thinkers, and instructors trained in interviewing, consulting, designing, and building living structure through sequences. The New Urbanist movement is an important model and perhaps a potential partner.

EXPERIMENTATION

Experimentation with *novel sequences* in both green-field and brown-site construction would also provide insight. How do people, both professional builders and lay audiences, actually experience the reality of creative building with sequences?

After six years of working with Alexander on the text of *NO*, I personally felt the need to try my hand and took on a small project—remodeling a modest 1930s adobe house in New Mexico. In this hands-on experience, the concepts that turned out to be the most useful were not the obvious ones. Rather, they included the following:

Mistakes redefined as mis (leave out) take. In a sequence (n, n + 1, n + 2) a decision must take into account all the variables present at each stage. A *mistake* is to miss—to fail to take into account—a variable. For sure, I made mis-takes, but my skill and results improved with practice.

Working with step-by-step differentiation does reduce the number of variables to be contended with at any one decision point and allows for evaluative hindsight at frequent intervals. The current practice of blueprint-to-completion contracts with very costly stipulations for change is a guarantee for mediocrity.

Double mapping. For example, in a kitchen or office sequence, start by mapping activities in a detailed, personal way. Only then map out that sequence within the given space.

Stay qualitative as long as possible and do rough, large-size mock-ups to increase the odds of structure-preserving moves. For example, nobody can predict the effect of a color from a square-inch sample. Get butcher paper and small quantities of several possible colors. Brush on the paint and pin up the butcher paper. See what each color does to the whole. Most of us should avoid computer-aided-design programs, which in theory can be modified repeatedly but, in practice, tend to lock people into premature and poor decisions.

Levels of scale as a tool. Making sure each decision informs the next larger-scale and next smaller-scale decision.

Attitude. Every mis-take, large and small, came from being in a hurry to finish and thus inattentive. Quality came from a still point where the boundary between subject and object (me and the work) dissolved into calm reciprocity.

The simplified fundamental process. The simple question, "What is the next, most simple step to bring forth more life?" does work. Go with that. Don't worry about the theory.

Realpolitik & Plugging in

Someone has suggested that if you want to learn something, go to where the disagreements are. The disconnect between Alexander and the New Urbanists is instructive.

Andreas Duany is fond of saying that his whole career has been founded on finding ways to take Alexander's thinking and "plug" it into mainstream construction and urban renewal. Alexander's stance is that current building practices will never lead to good buildings. "You can't get there from here." he says. In contrast, Duany says, "We have to get there from here. Here is where we are."

It is fair to say that much of the success of New Urbanism is due to embracing the world as it is and, at least partially, coming to grips with current building practices and identifying leverage points for change: codes, zoning, design methods, financial regulations. Even if the results fall short of Alexander's vision, taking the world as it is may be the only way to get beyond armchair philosophy and a rarely read four-volume opus on the library shelf.

There may also be other, less known avenues that would allow open-ended experimentation with the *NO* approach. We could make an analogy with the medical field where health is defined by absence of illness. Simple elimination of illness might give scope to healthier building.

Consider the work of Iraqi historian Besim Hakim, who has studied the old Muslim cities of the Mediterranean, where building codes were not, as ours are today, mechanical (i.e., standard setbacks of so many feet). Rather, based on more general laws of intention, these laws were really cultural and moral injunctions.

For example, a builder of a new house would have the intention of not interfering with the privacy or views of existing houses. Just how this is to be carried out could be creative and finely adapted to the specific context. Or, consider a building code that simply limited the kinds of building material to those already present, rather than imposing Disney-like

formulas. Consider home financing that would favor families upgrading a current home rather than speculation and house "flipping." Changing the financial context would naturally change the decisions.

Theories of Fun

During the years working with Alexander, I participated in early and limited attempts to transcribe two patterns (*entrance transition* and *one-room cottage*) into sequences. Experiments asking volunteers to follow the sequence and envisage an entrance or a cottage fell flat. People found following the sequence to be frustrating, confining, counter-intuitive, and boring. No real construction, nothing beyond the roughest sketch, was ever tried.

One source of help could come from a surprising corner. *APL's* unexpected readership in the 1970s and 1980s was the computer community, whose programmers saw the meta-level applicability of the pattern-language approach to programming problems. Perhaps this same community will now take their turn as the provider of new approaches. Will Wright, author of computer games such as Sim City, readily acknowledges inspiration from *APL.* Work on the theories of fun by programmers such as Raph Koster, offer insights into why computer games are addictive, why *APL* is widely appealing, why early draft sequences were not, and how one might construct experiments with sequences engaging wide audiences.

The key to "fun" in computer games is the experience of discovery as players go through nested levels of partial revelations. Abductive computer modeling affords the player increasing apprehension of unity. The play is its own reward as the player generates new perceptions and resolves anomalies and finds order. The validation is through an increase of one's scores.

If ethnographic methods and backstage work can produce a first generation of building-form sequences, theories of fun may guide their recasting into a second generation so that the user's exploration of how to differentiate space is, in itself, rewarding. The third generation would be beta testing with a larger audience. Perhaps forms of extreme programming can be used for reiterative corrections–hastening the natural process that requires centuries for patterns and sequences to emerge naturally.

One caveat is in order: The best game programming is still based on closed menus. Tutorials on known cases would work. Open-ended exploration on novel sequences would not work.

Emerging Forms and Methods

Often criticized for being "stuck in the past," Alexander's standard reply is he chooses old buildings as examples, not because they are old but because they are better. Fair enough—up to a point. Understanding the sequences behind deeply beautiful places from the past is not always nostalgia. These efforts can inform new sequences, new forms, and supporting technology for our own time and place.

But our society is unlikely to return to locally-based communities that remain coherent and stable. Ours is a time of globalization that ironically leads to both fragmentation and commodification. Strident narcissism is expressed in the built environment through the tidal wave of banal McMansions, aggressive stakeholders gambling on speculation, and professionals striving for signature buildings.

Indeed, we can argue that there has been a change of state in the relationship between the built environment and what Thomas de Zengotita calls in his recent *Mediated,* the overly "flattered self." Institutionalized seduction has become the normative mode of thought and behavior. We expect to be seduced, only dimly aware of how vacuous it all is.

We can build on the strengths of *A Pattern Language.* We can train black shirts. We can use open-source shareware for assembling results from a wide pool of experimenters. We can build on the concepts presented in *The Nature of Order* to create beauty.

But there will have to be some change in awareness before we can learn how to dwell and, thus, how to build. The real conundrum is how we get ourselves into the future by finding what philosopher David Levin has called a "rediscovered primordial attunement."

Empirical Findings from
The Nature of Order

Christopher Alexander

I am a scientist. The science of the last four centuries and especially the science of the last 150 years has profoundly shaped our culture and our civilization. We are now living in a world defined by a widely accepted group of statements and kind of knowledge that was non-existent before. These have changed our view of what a human being is. The offshoots of science have changed how we look at ourselves, how we think and feel, and how we view our social institutions, political institutions, love, war, and race. How we view children and how we view old age. How we view art and the making of things. How we view the birth and death of the cosmos.

Yet in this exuberant and fascinating surge of modern science, with all its authority and power, the divide between fact and value remains hardly changed at all. The questions of what we ought to do, how to solve problems, how we may attain the peaceful form of existence in which a person lives with quiet in one's heart, how to act to protect the planet, how to act so as to protect and help the wretched of the Earth, how to bring loving kindness into the workplace—these issues have hardly changed. If anything they have become more extreme, and every day more painful.

Science rarely helps us with these matters. We scientists have not yet laid down a way of thought that gives us a foundation of careful and tender action that deals with everyday life, makes common sense, and leads to actions that make the Earth more whole in its people and in its soil and substance. Indeed, the philosophy of science, which has brought us so far, has also made it more difficult to address these issues. The findings of science have intentionally separated the process of forming mechanical models of physics from the process of feeling and from appreciation of the poetic whole that forms our own existence.

In brief, then, we have not yet found a model through which we may understand things in an overall, wholesome way that is both rooted in fact, as deciphered by scientific effort, and also gives us a foundation for ethical daily thought and action. As a result, to put it bluntly, *we do not know who we are*. We can hardly act without floundering morally or emotionally. Often, we find ourselves in the greatest pain because things do not hold together. We cannot find a comfortable picture of our daily actions in relation to the larger whole of the Earth and universe.

In *The Nature of Order*, a four-volume work mainly written in the 30 years from 1975 to 2005, I have tried to construct a coherent picture that makes sense of these matters and gives us something worth living for.

How does *The Nature of Order* work? First, although the book is long, it is modest in intent and deals with something so ordinary that most scientific works never touch it—namely, the everyday world around us, the world of rooms and streets, houses and trees.

The four books of *The Nature of Order* continually try to describe our everyday world in objective terms, yet at the same time deal with the emotional world that this objective, ordinary world raises in all of us. It is an exploration of the way that we sentient, feeling creatures interact with our surroundings, and of the way that interaction leads us to understand ourselves and the nature of our lives, and ultimately even to understand, in part, the nature of our own souls.

<p style="text-align:center">* * *</p>

At the heart of this exploration there is a logical and empirical thread of argument that may be viewed as the core of my four books and that establishes the necessity of a new view of ourselves in relation to the world. This view ultimately nourishes (and, if accepted, could become the foundation of) a new kind of hope that is all the more profound because it integrates knowledge from philosophy, science, and religion to help us to experience the wholeness of the whole.

It could even shed light on the way wholeness occurs in the universe so that we might find help wrestling with the question of God. It might give us a path for our own access to that mystery, yet couched in acceptable, concrete terms of scientific reference.

The sequence of my argument follows a brief introduction to each of the four books and is arranged, as the books are, in four parts.

Book 1: *The Phenomenon of Life*

To lay a ground work for understanding built environments that support human well-being, I began about 40 years ago, searching for, defining, and identifying patterns of space that recurred in buildings, each one dealing with a particular range of problems that was likely to occur. By about 1975, these investigations, which I undertook with five colleagues, gave us gold. We discovered about 250 invariant spatial patterns, each one associated with the stability of a human-environmental system. These were published in *A Pattern Language* (Oxford University Press, 1977) and in several other books published in the same decade. They have become a standard part of what is known and used by architects.

During the late 1970s and early 1980s, I began to notice that these 250 patterns were themselves special cases of a small number of much deeper configurational properties. I began to hunt for these and try to purify them. In the end, after ten years of work, I had identified 15 of these properties. It began to seem more and more certain that all living structure—indeed, all "good" structure—is composed of these 15 fundamental properties.

It is significant that these 15 properties are not confined to buildings and works of art but are equally visible in nature. In naturally occurring physical systems, one could see that virtually all phenomena had, in one form or another, a configuration that was "composed" from, or at the very least strongly molded by, these 15 properties.

My co-workers and I began to feel that there was, in these phenomena, a recurrent structure of some kind—almost as if one could see the same deep structure in a huge variety of actual phenomena, and that it was so deep that each time it occurred, it took a different form, and was, nevertheless, always the same.

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The argument of Book 1, *The Phenomenon of Life,* may be captured by the following results that summarize 30 years of observation and experiment:

1. **A previously unknown phenomenon that may be called "life" or "wholeness" has been observed in artifacts. This quality has been noticed in certain works of art, buildings, public space, parts of buildings, and in a wide range of other humanmade things.**

2. **The idea of how much life is in things is objective in the sense of observation and is thus common to people of different inclinations and cultures. This is a surprise, since the finding seems to contradict the accepted wisdom of cultural relativity. (demonstrated)**

3. **This quality of life seems to be correlated with the repeated appearance of 15 geometric properties—or geometrical invariants—that appear throughout the object's configuration. (demonstrated)**

4. **We began to refer to this quality, in its geometrical aspect, as "living structure."**

5. **The appearance of living structure in things—large or small—is also correlated with the fact that these things induce deep feeling and a quality of connectedness in those who are in the presence of these things. (demonstrated)**

6. **Degree of life is an objective quality that may be measured by empirical methods. The empirical test that most trenchantly predicts "life" in things is a test that asks which of two things induces the greater wholeness in the observer and which of the two most nearly resembles the observer's inner self. (demonstrated)**

7. **Astonishingly, in spite of the vast variety of human beings and human culture, there is substantial agreement about these judgments, thus suggesting a massive pool of agreement about the deep nature of a "human self" and possibly suggesting that we may legitimately speak of "the" human self. (at least strongly indicated)**

8. **The 15 properties are the ways in which living centers can support other living centers. A center is a field-like centrality that occurs in space. (demonstrated)**

9. **In phenomena ranging in scale from 10^{-15} to 10^{-8} meters, on the surface of the Earth ranging from 10^{-5} to 10^5 meters, and at cosmological scales ranging from 10^9 to 10^{26} meters, the same 15 properties occur repeatedly in natural systems.**

10. **There is substantial empirical evidence that the quality of buildings and works of art as judged by knowledgeable people who have the experience to evaluate quality with some objectivity is predicted by the presence and density of the 15 properties. (demonstrated)**

11. **It is possible that the properties, as they occur in artifacts, may originate with cognition and work because of cognition, and that is why we respond to them.**

12. **But that cannot explain why they also occur, recur, and play such a significant role in *natural* phenomena.**

13. **Centers appear in both living and non-living structures. But in the living structures, there is a higher density and degree of cooperation among the centers, especially among the larger ones. This feature comes directly from the presence of the 15 properties and the density with which they occur. (demonstrated)**

Bks 2 & 3: *The Process of Creating Life* & *A Vision of a Living World*

How does this living structure come into being? Where does it come from? And why do these structural properties keep recurring? It is more important to ask this question about the phenomenon in nature than in architecture, since in nature living structure is being created all the time, in architecture only sometimes. Yet it is a question that—in this form—has hardly ever been asked from within the mainstream sciences.

As a rule, scientists take it for granted that naturally occurring structures are beautiful. So much so, that the questions "Why?" or "How do things become beautiful?" do not usually seem important to a scientist and are rarely posed as *scientific* questions. But when seen through the eyes of

an architect or looked at in the scale range that I look at professionally, these two questions come into sharp relief. They are questions that need answers. When one looks at architecture and modern cities, it is obvious that human beings can manage to make a terrible mess of their surroundings. This shows us by default that beauty does not come about automatically. Yet in nature it does seem to come about without effort!

Evidently, then, we must conclude that there are particular kinds of processes occurring in nature that, repeatedly and without effort, make things beautiful. It must be that somehow these natural processes are constrained or specialized in some way that allows nature's phenomena to become beautiful, while the same particular specialization of process is missing from most contemporary architecture, planning, and development. It is not impossible for beauty to arise in human artifacts, but it is relatively rare.

What process is it that is universally present in the processes of nature but is rarely present—indeed, most often missing—from contemporary town building and architecture?

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This is a new and important scientific question. Having arrived at the description of the 15 properties, and seen them as vitally important structures in *both* nature and architecture, the question regarding good and bad process gave me a clue to the answer, especially since both nature and the best architecture are characterized by a special kind of harmony, beauty, and wholeness. By the early 1990s, I had begun to focus on this particular class of processes—what I later came to call "unfoldings"—and asked why the underlying processes of nature and traditional architecture are able to create harmony and beauty without effort, while the processes of modern urban construction are almost never able to do so.

I believe these kinds of processes are common in nature—at all scales. But it is easier to identify them in architecture, because as an architect, one is more blatantly forced to ask how harmony comes about in the scale range of architecture. I believe this is why these transformations first surfaced in my studies in architecture and why they have not previously come to light or been described in physics or biology.

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Continuing the sequence of my argument, now focusing on the logic set forth in Book 2, *The Process of Creating Life*:

14. **The structure of living things has been shown to have a predictable geometric coherence at least partly governed by the 15 properties presented in Book 1. (demonstrated)**

15. **In examining the origin of those things in nature and in art that possess living structure, we find that this living structure comes about, almost without exception, as a result of an unfolding process that draws structure from the whole by progressive differentiation. (demonstrated)**

16. **More particularly, it is possible to define a new class of transformations—"wholeness-extending transformations"—that allow continuous elaboration of any portion of the world, according to non-disruptive and healing acts. [Note: In Book 2, the term "structure-preserving transformations" is used throughout. Since its publication, I have adopted the more expressive term "wholeness-extending."]**

17. **This progressive differentiation and coherence building can be shown to depend on the system of wholeness-extending transformations that preserve and extend wholeness. (demonstrated)**

18. **In addition, it can be shown that these transformations generate the 15 properties as a natural by-product of their wholeness-extending actions. (demonstrated)**

19. **It is precisely the use of these wholeness-extending transformations that has generated the greatly loved, and now treasured, traditional environments throughout the world. (demonstrated).**

20. **It can also be shown that the environments typically created by commercial development in the last 100 years are generated by an almost diametrically opposed system of wholeness-*disrupting* transformations. (demonstrated)**

21. **It may be concluded that healthy environments can only be generated by actions and processes based on wholeness-extending transformations. If we hope for health or living structure in our built environment, it is reasonable to say that the efforts of project initiation, design, planning, and construction must be revised to incorporate the necessary processes.**

22. **Not surprisingly, the new methods and processes required to achieve this healing will need to be substantially different from present-day commercial methods, thus requiring great courage and a widespread willingness to make serious changes in society. (demonstrated)**

23. **Examples throughout Book 2 demonstrate how a great variety of sequential-holistic processes can give rise to effective unfolding and produce new buildings and environments that have greater than normal coherence, adaptation, and harmony with their surroundings.**

24. **It is shown, above all, that it is the holistic and sequential nature of the unfolding that governs the coherent quality of end-product configurations. As far as we are aware, only this kind of process places appropriate emphasis on the well-being of the whole.**

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Continuing the argument as it is presented in Book 3, *A Vision of a Living World*:

25. **The core quality of an environment that is unfolded through wholeness-extending transformations is its deep relatedness to human beings in a way that may be called "belonging." (demonstrated)**

26. **This belonging must be something related to people's everyday inner feelings. This relatedness is not trivial but leads, rather, to a far deeper substance than the artificial constructions currently hailed as "art." (demonstrated)**

27. **In addition, structures created by a process of unfolding are likely to have a wider range of physical and human characteristics—far wider than the range of those visible in the homogeneous commercial projects of our time. They will, by their nature and by the nature of wholeness-extending transformations, nourish the land and people and give rise to a great depth and substance that provides genuine support for human beings and the Earth. (demonstrated)**

28. **Made in this way, the environment will be *sustainable as a whole*, and in a deeper and more comprehensive way than the partial technological sustainability that has become fashionable in recent years.**

29. **Book 3 provides many examples of buildings and building complexes where wholeness-extending transformations have been at work in different environmental and human settings. From these examples, one sees how much richer and more various both the processes and the resulting products are. (widely demonstrated)**

30. **Furthermore, in all these examples, there is a richer variety and greater number of living centers, at all scales, ranging from the very large to the very small. When one**

examines these examples, the characteristic change of overall quality that these techniques induce is plain to see. (demonstrated)

31. It is anticipated that such environments will, by their nature, give honor and respect to all people on earth. (Partially verified, but certainly not yet truly demonstrated, since many more examples from different cultures still need to be built and tested.)

32. As far as the extant examples are concerned, they seem to come closer to a new form of collective art that evokes the true nature of people able to express and live their own aspirations, culture by culture. All these examples encourage people to increase their own self-esteem and that of others.

33. By honoring the wholeness of the Earth and its neighborhoods, these newly built places, in their physical character and presence, are also likely to encourage and support new depths of spiritual seriousness in the people who make them and for whom they are made.

34. Such environments have not previously been an object of scientific study. The in-depth analysis and description of such profoundly made environments advances our understanding of the basic qualities and characteristics of the environment and offers an approach to healing.

35. Most important is that the many experiments described in Book 3 use the generating processes put forward in Books 1 and 2, and one can *see the results.* Briefly put, the places are experienced by people who live in them, work in them, or visit them, as something that establishes a deeper connection. In some fashion, which appears inescapable, the theory of Books 1 and 2, is confirmed by the physical results in building and by the way these places work—far more deeply, so it is argued, by people who have been in them—than the normal buildings and plans made by other contemporary methods. (demonstrated)

36. It is to be hoped that the empirical base will not only provide a sturdy underpinning for a new way of regarding the world we live in but will also provide a foundation for social and political methods of achieving these results on a wider scale. This empirical base also validates an interpretation that describes the interaction of people and their environment in a much deeper fashion than we have been used to in contemporary dialogue. Something has shifted.

Book 4: *The Luminous Ground*

In the fourth chain of my argument, I come back to the process of *doing* any work of unfolding and the core activity that needs to be followed for the unfolding to arise successfully. This depends on a cognitive state that will allow a human being—any artist, maker, architect or planner—indeed, any-one—to perform an unfolding successfully. This requires that he or she pay attention to the *whole* (not always easy)—a skill that must be learned, since it requires that the person forget himself or herself sufficiently to be able to act as nature does.

Let us now take a deeper look at the nature of these centers from which wholeness is composed. In Book 1, I defined a center as a field-like centrality that occurs in space. It is not an object. It is not a point. It is a holistic phenomenon that appears within a larger whole. Wholeness is composed of centers. So we have a recursive phenomenon here: centers appear in wholeness; wholeness is composed of centers. Each center has some degree of life. The life that a center has is a function of the configuration of centers that surround it and of the degree of life that these surrounding centers have. In slightly different language, a living center is a center that is unusually dense in other living centers.

Conceptually, it is not easy to hold on to this enormous multiplicity of interconnected living centers, each working on others and doing so through the action provided by the 15 properties. Toward the end of my efforts to understand this phenomenon, I came to a formulation that expressed this in a helpful way. Namely, I chose to use the word "beings" to describe living centers. This language was slightly shocking, since it smacked of sensationalism, even of exaggeration. I found it extremely helpful, however, to think of and to see living centers—the focal points of a living structure—as "beings."

What the word does that is especially useful is to avoid the often antiseptic language of mathematics and admit, into the phenomenon of living structure, a sense that life in some form—biological, artistic, poetic, mythical—is a *real* thing, a thing that has spirit. When one conceives a living structure as made of a multitude of beings, it allows one to give dignity to the fact that it really is *life* that is being created and that has established its presence there, not only an antiseptic shell.

In the first part of Book 4, I describe this apparent life as it appears in technically "dead" stones, in marks of paint, in the roof of a certain building, in a window, or a window pane. This way in which an inanimate configuration springs to life and calls forth life is what brings us face to face with the significance—and meaning—of the phenomenon!

I do not want to go *too* far with the concept of beings and have introduced the term only because it conveys a better sense of the enormous nature of what is going on when centers form in space. Nevertheless, the concept does underline what has already been established in early sections of this argument—namely, that one must conclude that space itself is somehow being-like, has the potential for beings to appear in it, not in the mechanistic sense of assembly from components, but in the far more startling sense that something within space and matter can be awoken by the presence of the proper configurations. It is this that begins, firmly, to close the argument and point toward a much deeper nature of matter and space than to what we are accustomed.

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Completing my summary of the argument, the following steps are laid out and explored in Book 4, *The Luminous Ground*:

37. **The empirical arguments presented in Books 1, 2, and 3, are fairly straightforward. They provide a concrete, substantial way of understanding the quality of artifacts, works of nature, and works of building. But what has not been visible so far is that the web of these empirical findings leads to an altogether deeper and somewhat mysterious picture. This picture must be understood so that one can fully grasp the significance of the earlier empirical discoveries.**

38. **Let us come back, then, in this fourth book, to the whole: the nature of the living whole and the way that any one part of that whole plays its role within the larger whole, binding everything together. To some degree we have a picture of the way this happens, also of the processes that make it happen. But what is the meaning of these processes? What is their significance in the larger scheme of things?**

39. **We have seen that living structure occurs when centers unfold from the whole and form complex binding schemes in which larger centers emerge from the whole, intensify the life of whole, and are built from smaller centers. (demonstrated)**

40. **We have also seen, repeatedly, that any example of living structure creates a connection between that structure and the human self and is in some definite sense "personal." (demonstrated)**

41. These observations gain empirical support from the experiments in Book 1, which indicate that perception of a self-like quality in a thing (whether it be natural or humanmade) provides the most direct access to the degree of life in the thing. (demonstrated)

42. The observations also gain strong empirical support from the experiments described in Book 3, where attention to the living structure in an environment strongly increases the feeling of belonging that people experience there. (demonstrated)

43. These two conclusions suggest that what I call "living structure"—whether it occurs in nature or in art—is entangled with the human self, in some fashion that we have not previously understood.

44. More specifically, every single living center that appears repeatedly in living structure, at many overlapping scales, has a character connected to the human self.

45. Even more exactly, any environment that has life or, for that matter, any system or work of art that has life incorporates multiple and sometimes very large numbers of living centers that appear to be being-like—i.e., self-like. This appears to be a fact of nature—*not* merely a psychological or cognitive interpretation.

46. Experiments, observations, and descriptions of these phenomena finally bring us to the brink of something one can hardly avoid saying—namely, that the natural phenomena and artifacts made in this way and the living structure they exhibit strongly suggest the need for a modified understanding of the nature of matter.

47. It appears that the process of making a living environment succeeds or not to the degree that the making process is based on the repeated use of the criterion, "How much is this part, that part, or that whole like my true, inner self?" We thus find a substantial, empirically-based clue for making ecologically wholesome places, spiritually sustaining places, and energetically self-supporting places.

48. By empirical standards, this is a startling proposal. All these forms of making are dependent on perceptions and actions that might be imagined as appropriate and natural for a 14th-century Christian monk or a Sufi saint. They are far removed from the current late-20th century version of our scientific world view and what it tells us to do.

49. If the view presented turns out to be a sound and testable picture of reality, as my experiments suggest, we must then be prepared to contemplate and perhaps in the end *accept* a modification in our present-day view of the nature of space and matter.

50. In any case, whether we succeed in this renewal or not, it does seem that there are good grounds for reviewing our picture of the nature of living structure and the matter from which we are made and which surrounds us. (demonstrated)

51. At the very least, in my experience, thoughtful people who have contemplated these issues and thought about them carefully, find—sometimes with a sigh of acceptance and relief—that, within this frame of reference, they are finally able to live in a world that makes sense. They are able to act in a way that makes sense and without those actions being based on any current canons of morality.

52. This is a world view in which acceptance of the whole and efforts to heal the whole can be seen as the most profound and most important forms of prayer. This world view is consistent with modern science and yet calls into question some of science's most deeply rooted assumptions.

53. It is a new kind of thought about matter, in which our understanding of the world is coupled with the idea of healing the world, and in which our relation with the world is

to be understood through realizing that our own selves are in the world, part of it, and not separated from it.

54. **In such a modified world view, science can perhaps be brought into alignment with human feeling and awareness.**

55. **An apparent link between environment, self, God, and matter has shown itself. It has been uncovered by carefully raking through the ashes of our mechanical civilization and in the attempt to build a phoenix of living structure that may arise again, if we choose to pay sufficient attention to it.**

56. **In any case, the world can become beautiful as a result of efforts based on this new understanding. (demonstrated)**

57. **As a result of these investigations, it may turn out best if we redefine the concept of God in a way that is more directly linked to the concept of "the whole." This would permit the reconciliation of our daily efforts with the well being of the whole— something that is anyway necessary from a scientific point of view. But in so doing, we may be able to unite the mental and emotional territory of what was traditionally called God in a way that provides the connectedness that people crave and in a way that allows people to feel humility and responsibility for the whole as part of the sum total of mentality that once existed in other cultures and that must exist in our own highly modern civilization in a way that is true to the facts.**

58. **We would then have the goal of making a world that is literally made, as far as possible, from "self." This means, of course, the eternal self that lies in each of us and manifests in living structure. This also means that the world is to be made of *this* substance.**

59. **But, even more shocking and exciting, there may lie ahead new ways of understanding physics and biology in these terms so that space and matter would be linked and entangled, literally, with the source of all consciousness, by reference to the whole and its hitherto misunderstood properties.**

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The empirical findings—those that I have marked above as "demonstrated"—are expressed in the four books with sufficient background so that it is clear that they are testable and *have* been tested. It is also clear that more rigorous experiments along the same lines can be done, with larger samples, to reach conventional standards of scientific acceptance.

I have not pursued this traditional scientific avenue to its full conclusion, since the construction of the *logic* of this chain of reasoning was a harder and more important task, arduous in the extreme. I spent most of these last 30 years working to make the chain of argument as clearly and as logically as I could. My experiments brought results that have established a prima facie case that the findings are reasonable and plausible. They now simply need confirmation through experiments conducted along more exact lines.

I look to my colleagues and to a new generation of scientists to carry this work forward with the necessary rigor.