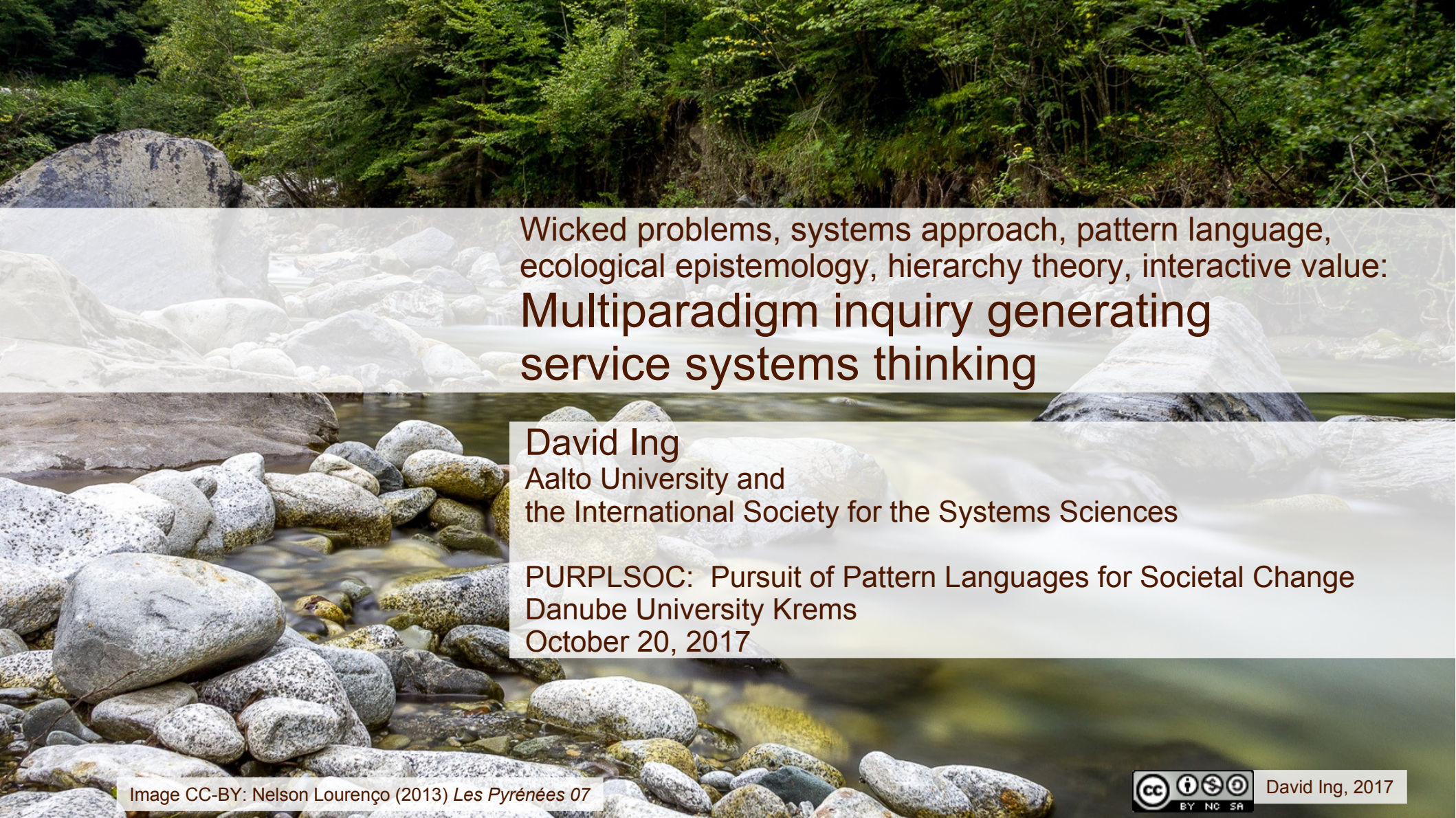


Wicked problems, systems approach, pattern language, ecological epistemology, hierarchy theory, interactive value:

Multiparadigm inquiry generating service systems thinking

David Ing
Aalto University and
the International Society for the Systems Sciences

PURPLSOC: Pursuit of Pattern Languages for Societal Change
Danube University Krems
October 20, 2017

Image CC-BY: Nelson Lourenço (2013) *Les Pyrénées 07*

Agenda

1. What is multiparadigm inquiry?

2. Where have (and might have) (1960s-2010s) paradigms influenced generative pattern language?

3. Why might a pattern language project or community pay more attention to its paradigm?

A *paradigm* is, (according to the *Oxford English Dictionary*) …

1. A pattern or model, an exemplar; (also) a typical instance of something, an example.

2.

a. *Grammar*. In the traditional grammar of Latin, Greek, and other inflected languages: a pattern or table showing all the inflected forms of a particular verb, noun, or adjective, serving as a model for other words of the same conjugation or declension. Also *fig*.

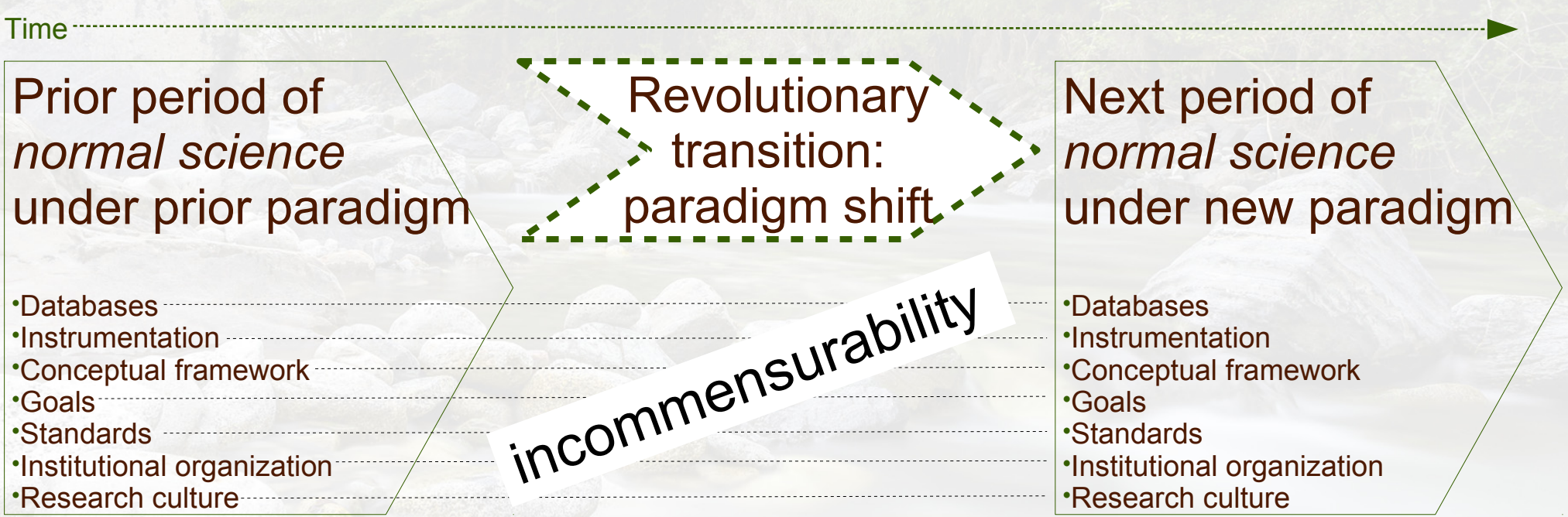
b. *Linguistics*. A set of units which are linguistically substitutable in a given context, esp. a syntactic one.

3. *Rhetoric*. A figure of speech in which a comparison is made by resemblance; = **paradigma** *n*. 1. *rare*.

4. A conceptual or methodological model underlying the theories and practices of a science or discipline at a particular time; (hence) a generally accepted world view.

1962 T. S. Kuhn *Struct. Sci. Revol.* ii. 10 'Normal science' means research firmly based upon one or more past scientific achievements..that some particular scientific community acknowledges..as supplying the foundation for its further practice... I..refer to [these achievements] as 'paradigms'.

Kuhn saw *normal science* under a paradigm with *revolutionary transitions* to the next paradigm



Kuhn modeled the history of a science as a succession of dogmatic periods of "normal science" under a "paradigm", separated by "revolutionary" transitions to the next paradigm. According to Kuhn such a break from the past rejuvenates a field that had stagnated under the weight of anomalies that it no longer seemed to have the resources to solve. A new paradigm introduces changes at all levels, from established databases and instrumentation to the conceptual framework, goals, standards, institutional organization, and research culture —so much so that some older practitioners can hardly recognize the new paradigm as their field. This disconnect produces "incommensurability" across paradigm change, ranging from communication failure to problems of rational choice between the two, since there exists no fixed measure of success.

Source: Nickles, Thomas, "Historicist Theories of Scientific Rationality", *The Stanford Encyclopedia of Philosophy* (Summer 2017 Edition), Edward N. Zalta (ed.), https://plato.stanford.edu/archives/sum2017/entries/rationality-historicist/.

Multiparadigm inquiry is an alternative to modern and postmodern approaches, towards greater reflexivity

	Modern	*Multiparadigm*	*Postmodern*
Ideology	**Centering** Focus on authorship, promote chosen voices, beliefs and issues Sharpen selective focus	**Accommodating** Value divergent paradigm lenses Explore paradox and plurality	**De-centering** Stress fluctuating and fragmented discourses Accentuate difference and uncertainty
Ontology	**Strong** States of being Entities are distinct, determinant and comprehensible	**Stratified** Multiple dimensions Expose interplay of entries and processes	**Weak** Processes of becoming Meanings are indeterminant, in constant flux and transformation
Epistemology	**Restricted** Employ paradigm prescriptions systematically Construct cohesive representations to advance paradigm development	**Pluralist** Apply divergent paradigm lenses Reflect organizational tensions and encourage greater reflexivity	**Eclectic** Use varied methods freely Deconstruct organizational contexts and processes to produce small stories or modest narratives

Source: Lewis, Marianne W., and Mihaela L. Kelemen. "Multiparadigm inquiry: Exploring organizational pluralism and paradox." *Human Relations* 55, no. 2 (2002): 251-275. https://doi.org/10.1177/0018726702055002185

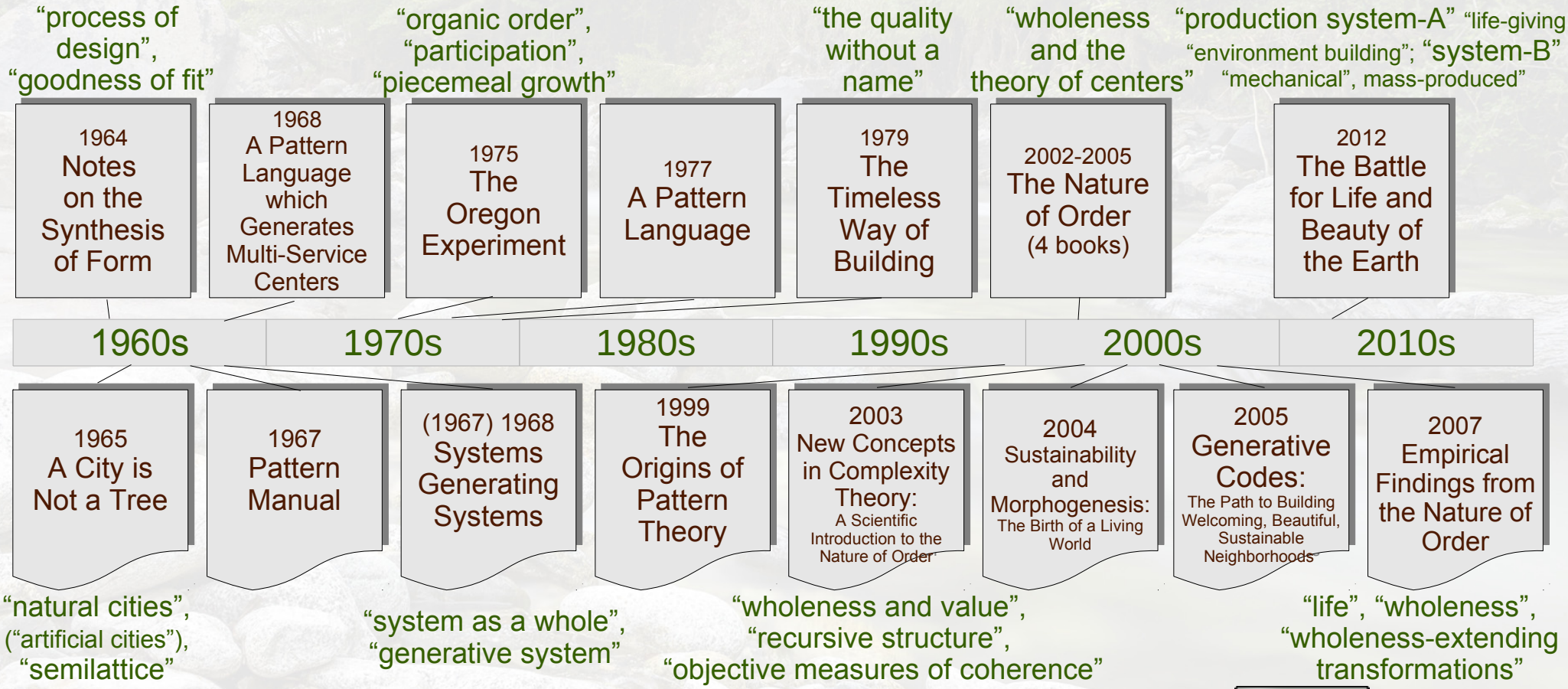
Agenda

1. What is multiparadigm inquiry?

2. Where have (and might have) (1960s-2010s) paradigms influenced generative pattern language?

3. Why might a pattern language project or community pay more attention to its paradigm?

Over 50 years, Christopher Alexander and coauthors evolved concepts and language in built environments



At Berkeley: Churchman, Rittel and Alexander taught in 1960-1970s

C. West Churchman (1913-2004)

- 1957 joined Berkeley, graduate programs in OR at School of Business Administration
- 1964-1970 Associate Director and Research Philosopher, Space Sciences Laboratory
- 1981-1994 retired, taught Peace & Conflict Studies

Horst Rittel (1930-1990)

- 1963 Berkeley College of Environmental Design
- 1974 both Berkeley and University of Stuttgart

Christopher Alexander (1936 -)

- 1963 Berkeley College of Environmental Design
- 1967 cofounder Center for Environmental Structure
- 1998 retired from university

Both Alexander and Rittel were part of what at the time was called the 'design methods' movement in architecture, worked and taught in the same building, and did talk and were seen walking off to have lunch together. Churchman was teaching in the Business School a few minutes down on the way to the center of campus.

- *Thor Mann*
  (posted April 17, 2017)

“Systems Generating Systems”, Alexander (1968)

1. There are two ideas hidden in the word system: the idea of a *system* as a whole and the idea of a *generating* system.
2. A *system as a whole* is not an object but a way of looking at an object. It focuses on some holistic property which can only be understood as a product of interaction among parts.
3. A *generating system* is not a view of a single thing. It is a kit of parts, with rules about the way these parts may be combined.
4. Almost every ‘system as a whole’ is generated by a ‘generating system’. If we wish to make things which function as ‘wholes’ we shall have to invent generating systems to create them. [....]

In a properly functioning building, the building and the people in it together form a whole: a social, human whole. The building systems which have so far been created do not in this sense generate wholes at all. (Alexander, 1968, p. 605)

“The Systems Approach and Its Enemies”, (Churchman, 1979)

Common to all these enemies is that none of them accepts the reality of the "whole system": we do not exist in such a system. Furthermore, in the case of morality, religion, and aesthetics, at least a part of our reality as human is not "in" any system, and yet it plays a central role in our lives.

To me these enemies provide a powerful way of learning about the systems approach, precisely because they enable the rational mind to step outside itself and to observe itself (from the vantage point of the enemies). [....]

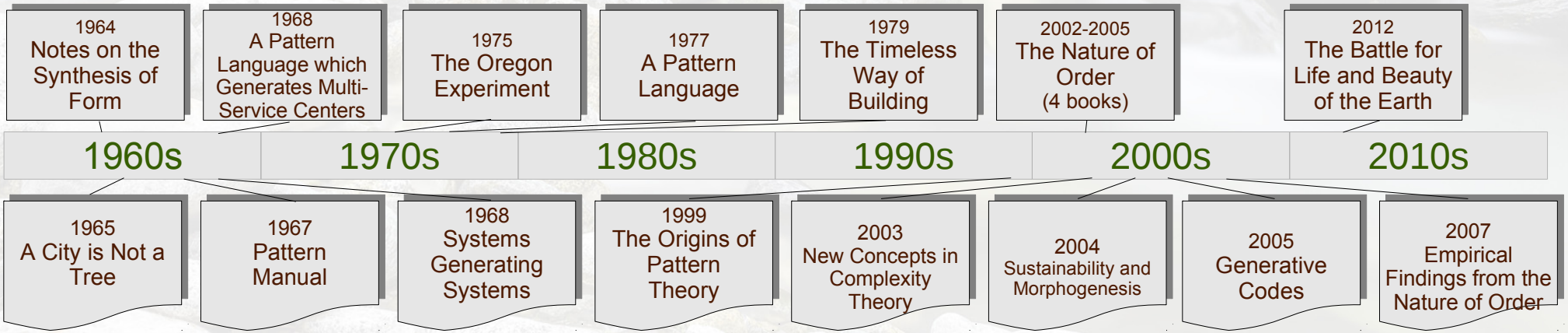
We must face the reality that the enemies offer: what's really happening in the human world is politics, or morality, or religion, or aesthetics. This confrontation with reality is totally different from the rational approach, because the reality of the enemies cannot be conceptualized, approximated, or measured (Churchman, 1979, pp. 24–53).

“Dilemmas in a General Theory of Planning”, (Rittel + Weber, 1973)

There are at least ten distinguishing properties of planning-type problems, i.e. wicked ones .... We use the term “wicked” in a meaning akin to that of “malignant” (in contrast to “benign”) or “vicious” (like a circle) or “tricky” (like a leprechaun) or “aggressive” (like a lion, in contrast to the docility of a lamb). [....]

1. There is no definitive formulation of a wicked problem ....
2. Wicked problems have no stopping rule ....
3. Solutions to wicked problems are not true-or-false, but good-or-bad ....
4. There is no immediate and no ultimate test of a solution to a wicked problem ....
5. Every solution to a wicked problem is a "one-shot operation"; because there is no opportunity to learn by trial-and-error, every attempt counts significantly ....
6. Wicked problems do not have an enumerable (or an exhaustively describable) set of potential solutions, nor is there a well-described set of permissible operations that may be incorporated into the plan ....
7. Every wicked problem is essentially unique ....
8. Every wicked problem can be considered to be a symptom of another problem ....
9. The existence of a discrepancy representing a wicked problem can be explained in numerous ways. The choice of explanation determines the nature of the problem's resolution ....
10. The planner has no right to be wrong ....

An open system of knowledge recognizes parallel research



Architecture ~ problem-seeking. Design ~ problem-solving

1969
William Pena + John Focke
Problem Seeking: New directions in architectural programming

Design is problem solving; programming is problem seeking. […] The "total problem" ... serves to point up constituent problems, in terms of four considerations, those of form, function, economy and time.

1971
Horst Rittel
Some Principles for Design of an Educational System for Design
(J. Arch Edu)

Instrumental knowledge relates three kinds of entities with each other: 1. Performance Variables …. 2. Design Variables … 3. Context Variables ….

"**Under context C (O), design configuration D (O) will lead to performance P (O).**"

Recurring Difficulties in Design

1. … the worthwhileness of a project
2. … the appropriate level of a problem
3. … the nature of the solution
4. … an evaluation system [….]
11. … to implement a solution proposal
12. … to test the results

2006/03/02
Grady Booch
On Design
(IBM blog)

As a noun, design is the named (although sometimes unnamable) structure or behavior of an system whose presence resolves or contributes to the resolution of a force or forces on that system. […]

As a verb, design is the activity of making such decisions. Given a large set of forces, a relatively malleable set of materials, and a large landscape upon which to play, the resulting decision space may be large and complex. [….]

All architecture is design but not all design is architecture.

1964
Notes on the Synthesis of Form

1968
A Pattern Language which Generates Multi-Service Centers

1975
The Oregon Experiment

1977
A Pattern Language

1979
The Timeless Way of Building

2002-2005
The Nature of Order
(4 books)

2012
The Battle for Life and Beauty of the Earth

1960s | 1970s | 1980s | 1990s | 2000s | 2010s

1965
A City is Not a Tree

1967
Pattern Manual

1968
Systems Generating Systems

1999
The Origins of Pattern Theory

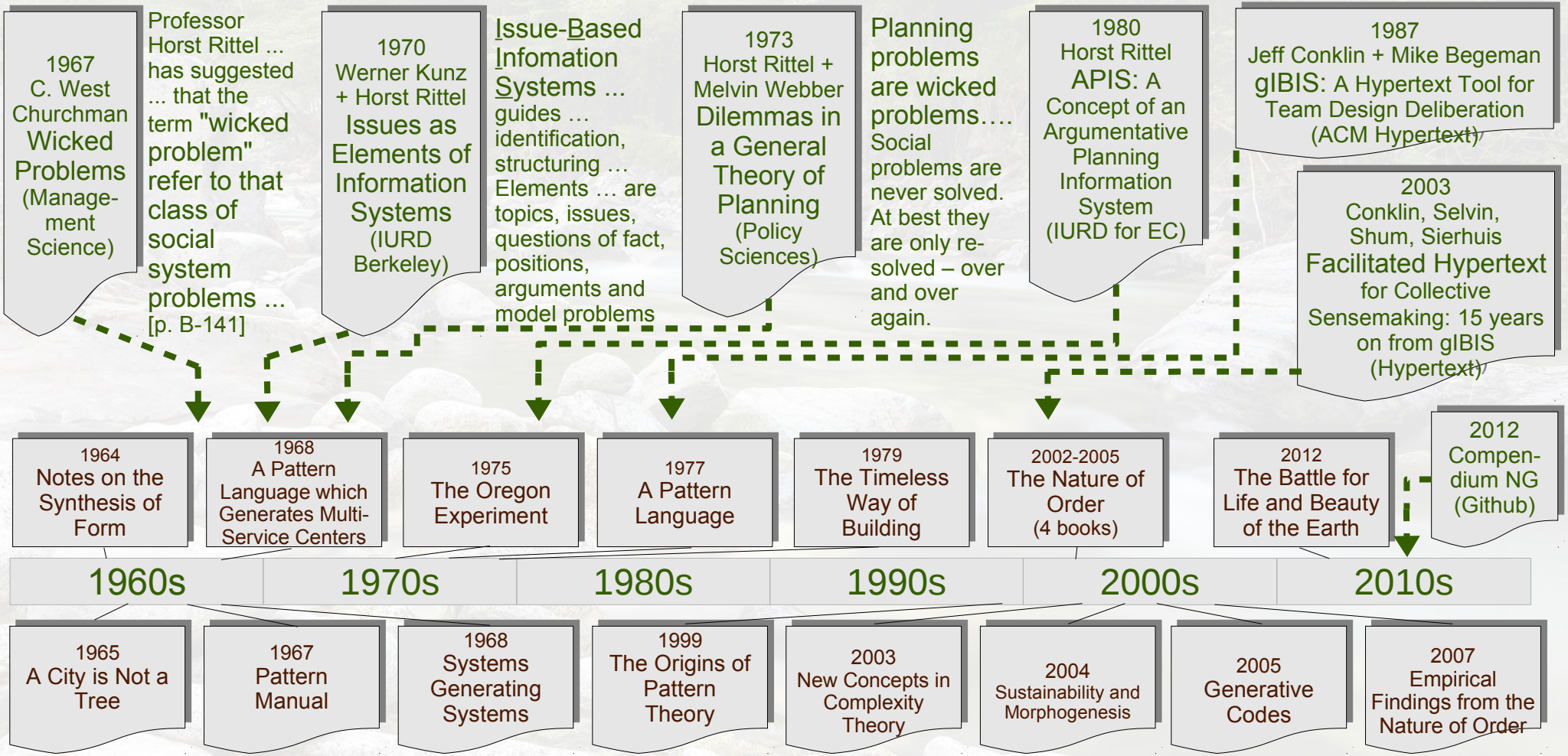
2003
New Concepts in Complexity Theory

2004
Sustainability and Morphogenesis

2005
Generative Codes

2007
Empirical Findings from the Nature of Order

Wicked problems led to IBIS and argumentation schemes



Systems approach led to assumption surfacing, postnormal science

1956
Kenneth Boulding
General Systems Theory: The Skeleton of Science
(Management Science)

1971
C. West Churchman
The Design of Inquiring Systems

We are interested in the **design of systems**, i.e., of structures that have organized components. [….]
Inquiry is an activity which produces knowledge.

1979
C. West Churchman
The Systems Approach and its Enemies

Common to all these enemies is that none of them accepts the reality of the "whole system": we do not exist in such a system. [….]
We must face the reality that the enemies offer: what's really happening in the human world is **politics, or morality, or religion, or aesthetics**.

1981
Richard Mason + Ian Mitroff
Challenging Strategic Planning Assumptions

1986
Russell Ackoff + Jamshid Gharajedaghi
Reflections on Systems and their Models
(Systems Research)

2004
Jerome Ravetz
The Post-Normal Science of Precaution
(Futures)

1964
Notes on the Synthesis of Form

1968
A Pattern Language which Generates Multi-Service Centers

1975
The Oregon Experiment

1977
A Pattern Language

1979
The Timeless Way of Building

2002-2005
The Nature of Order
(4 books)

2012
The Battle for Life and Beauty of the Earth

1960s | 1970s | 1980s | 1990s | 2000s | 2010s

1965
A City is Not a Tree

1967
Pattern Manual

1968
Systems Generating Systems

1999
The Origins of Pattern Theory

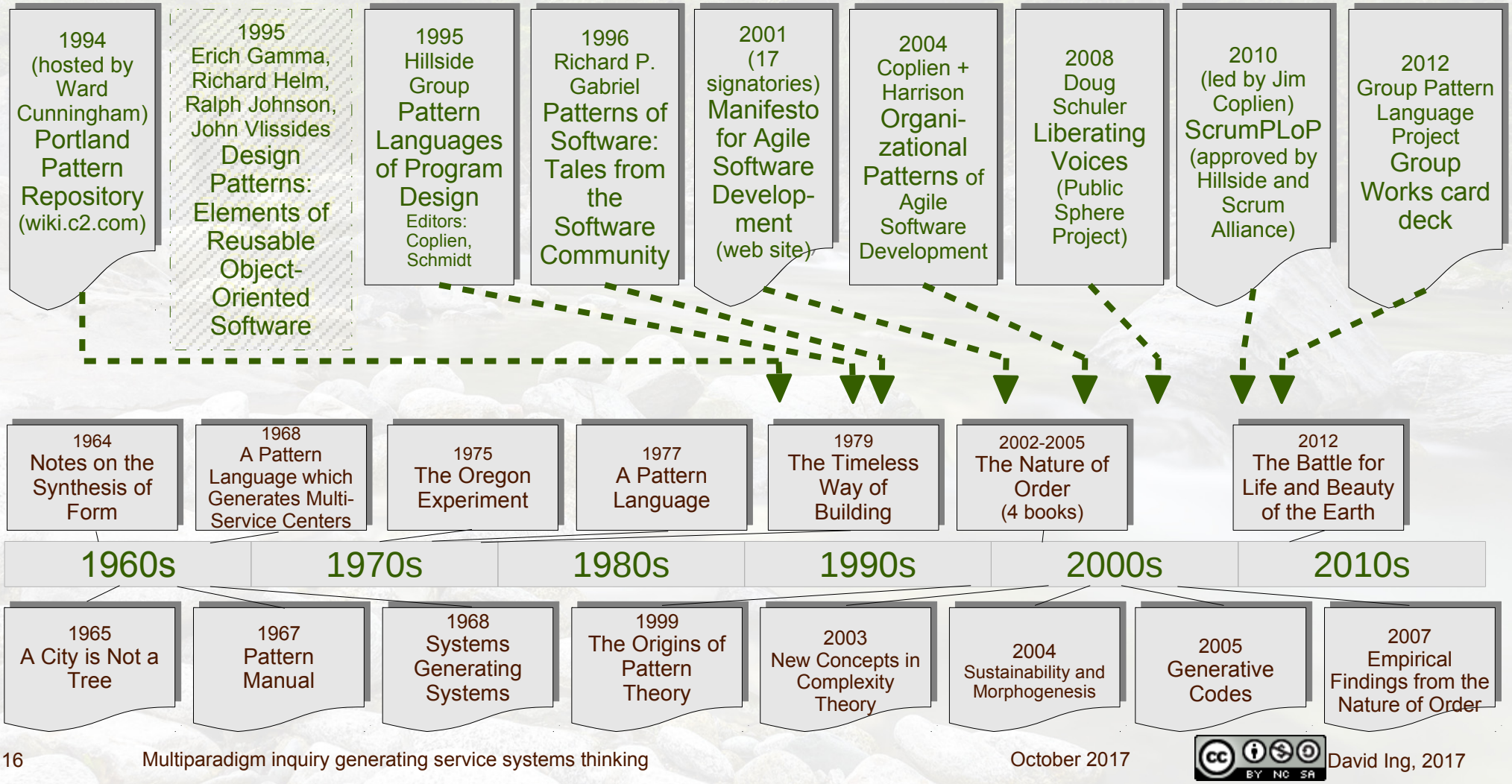
2003
New Concepts in Complexity Theory

2004
Sustainability and Morphogenesis

2005
Generative Codes

2007
Empirical Findings from the Nature of Order

Pattern language has risen in agile, groups, public sphere



Ecological epistemology led to interaction design + affordances

1972 Gregory Bateson Steps to an Ecology of Mind

The questions which the book raises are ecological: **How do ideas interact?** Is there some sort of natural selection ...? What sort of economics limits ...? What are the necessary conditions for stability (or survival) of such a system or subsystem?

1979 James J. Gibson The Ecological Approach to Visual Perception

The affordances of the environment are what it offers the animal, what it provides or furnishes, either for good or ill. …. I mean by it something that refers to both the environment and the animal in a way no existing term does. It implies the complementarity of the animal and the environment

1997 ACM CHI97 Towards a Pattern Language for Interaction Design (SIGCHI Bulletin 1998)

1999 Donald A. Norman Affordance, Conventions, and Design (Interactions)

2000 Tim Ingold The Perception of the Environment: Essays on livelihood, dwelling and skill

2011 Tim Ingold Being Alive Essays on movement, knowledge and description

1964 Notes on the Synthesis of Form

1968 A Pattern Language which Generates Multi-Service Centers

1975 The Oregon Experiment

1977 A Pattern Language

1979 The Timeless Way of Building

2002-2005 The Nature of Order (4 books)

2012 The Battle for Life and Beauty of the Earth

1960s | 1970s | 1980s | 1990s | 2000s | 2010s

1965 A City is Not a Tree

1967 Pattern Manual

1968 Systems Generating Systems

1999 The Origins of Pattern Theory

2003 New Concepts in Complexity Theory

2004 Sustainability and Morphogenesis

2005 Generative Codes

2007 Empirical Findings from the Nature of Order

Hierarchy theory led to panarchy and resilience science

1982 Timothy F.H. Allen + Thomas B. Starr **Hierarchy: Perspectives for Ecological Complexity**

... patterns that generally remain opaque until we model using hierarchies. By hierarchy is understood **a system of behavioral interconnections whereby the higher levels constrain and control the lower levels** to various degrees depending on the time constants of the behavior.

1994 Stewart Brand **How Buildings Learn: What Happens After They're Built**

2002 Lance Gunderson + C.S. Holling **Panarchy: Under-standing Transfor-mations in Human and Natural Systems**

2004 Walker, Holling, Carpenter, Kinzig **Resilience, Adaptability and Transformability in Social-Ecological Systems** (Ecology & Society)

Resilience is the capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks.

2015 Juan Carlos Rocha, Garry Peterson, Reinette Biggs **Regime Shifts in the Anthropocene: Drivers, Risks and Resilience** (PLoS ONE)

1964 Notes on the Synthesis of Form

1968 A Pattern Language which Generates Multi-Service Centers

1975 The Oregon Experiment

1977 A Pattern Language

1979 The Timeless Way of Building

2002-2005 The Nature of Order (4 books)

2012 The Battle for Life and Beauty of the Earth

1960s | 1970s | 1980s | 1990s | 2000s | 2010s

1965 A City is Not a Tree

1967 Pattern Manual

1968 Systems Generating Systems

1999 The Origins of Pattern Theory

2003 New Concepts in Complexity Theory

2004 Sustainability and Morphogenesis

2005 Generative Codes

2007 Empirical Findings from the Nature of Order

Interactive value is in the shift to a service economy

1994
Richard Normann + Rafael Ramirez
Designing Interactive Strategy: From Value Chain to Value Constellation

Co-production is the term we use to describe the 'reciprocal' relationships between actors which characterize the service economy.

Offerings organize activities along several dimensions: (1) In time …; (2) In space or location …; and (3) In terms of relationships among actors ….

2004
Stephen Vargo + Robert Lusch
Evolving to a New Dominant Logic for Marketing
(J. Marketing)

… *operand resources* as resources on which an operation or act is performed to produce and effect, and … *operant resources,* which are employed to act on operand resources … A goods-centered dominant logic developed in which operand resources were considered primary.

A **service-centered view** implies processes … largely focused on operant resources ...

2007
Spohrer, Maglio, Bailey, Gruhl
Steps Towards a Science of Service Systems
(IEEE Computer)

2011
Haluk Demirkan, Jim Spohrer, Vikas Krishna
The Science of Service Systems

1964
Notes on the Synthesis of Form

1968
A Pattern Language which Generates Multi-Service Centers

1975
The Oregon Experiment

1977
A Pattern Language

1979
The Timeless Way of Building

2002-2005
The Nature of Order
(4 books)

2012
The Battle for Life and Beauty of the Earth

1960s | 1970s | 1980s | 1990s | 2000s | 2010s

1965
A City is Not a Tree

1967
Pattern Manual

1968
Systems Generating Systems

1999
The Origins of Pattern Theory

2003
New Concepts in Complexity Theory

2004
Sustainability and Morphogenesis

2005
Generative Codes

2007
Empirical Findings from the Nature of Order

Agenda

1. What is multiparadigm inquiry?

2. Where have (and might have) (1960s-2010s) paradigms influenced generative pattern language?

3. Why might a pattern language project or community pay more attention to its paradigm?

If they can get you asking the wrong questions, they don't have to worry about answers (Thomas Pynchon)

Type **1** error	**False positive**: finding a (statistical) relation that isn't real
Type **2** error	**False negative**: missing a (statistical) relation that is real
Type **3** error	**Tricking ourselves**: Unintentional error of solving wrong problems precisely (through ignorance, faulty education or unreflective practice)
Type **4** error	**Tricking others**: Intentional error of solving wrong problems (through malice, ideology, overzealousness, self-righteousness, wrongdoing)

Ian I. Mitroff and Abraham Silvers. 2010. *Dirty Rotten Strategies: How We Trick Ourselves and Others into Solving the Wrong Problems Precisely.* Stanford University Press.

Try practice → theory with Alexander (2012) Battle (of 1985)?

Alexandrian methods for built environments	
(i) Pattern language for the community	(a) Interviewing on hopes and dreams (b) Making a first sketch of a patttern languages (c) Making a first draft pattern language from teachers‘ comments (d) Checking seven principles for completeness of the languages (e) Refining the language (f) Creating pattern language as a list of key centers
(ii) Construction budget	(a) Making a record of all of the spaces and areas which were defined by the pattern languages (b) Trimming all space to available budget, as an average percentage reduction for all items of interior space, and then exterior space (c) Asking faculty to re-allocate the spaces, keeping the same trimmed totals, conforming with the available resources
(iii) Reality of the land	(a) Laying out the site plan on the ground (b) Finding the two fundamental systems of centers, and combining them (c) Visualizing the evolving site plan with marks on the land (e.g. flags) (d) Fixing first hardline drawings of detailed positions on the site (position, orientation, dimension) (e) Judging detailed building positions on the land (with flags) (f) Recording the site plan on paper

Dialectical assumptional analysis is a generative approach

Step	Activity	Means for Accomplishing
1.	• Formation of Different Groups	• MAPS (Multivariate Analysis and Participative Structure) Design Technology • Personality Type Technology • Ad Hoc Group Technology • Vested Interests Technology
2.	• Assumption Surfacing	• Stakeholder Analysis • Assumption Sorting
3.	• Dialectical Debate between Group Policies and Synthesis	• Assumption Negotiation • Assumptional Decision Theory

… the environment is more often than not one of constantly changing conditions, uncertainty, and turbulence than that of certainty, stability and predictability. Little wonder that under these conditions problem forming and problem defining become as important, if not more so, than problem solving by means of conventional techniques.

[…]

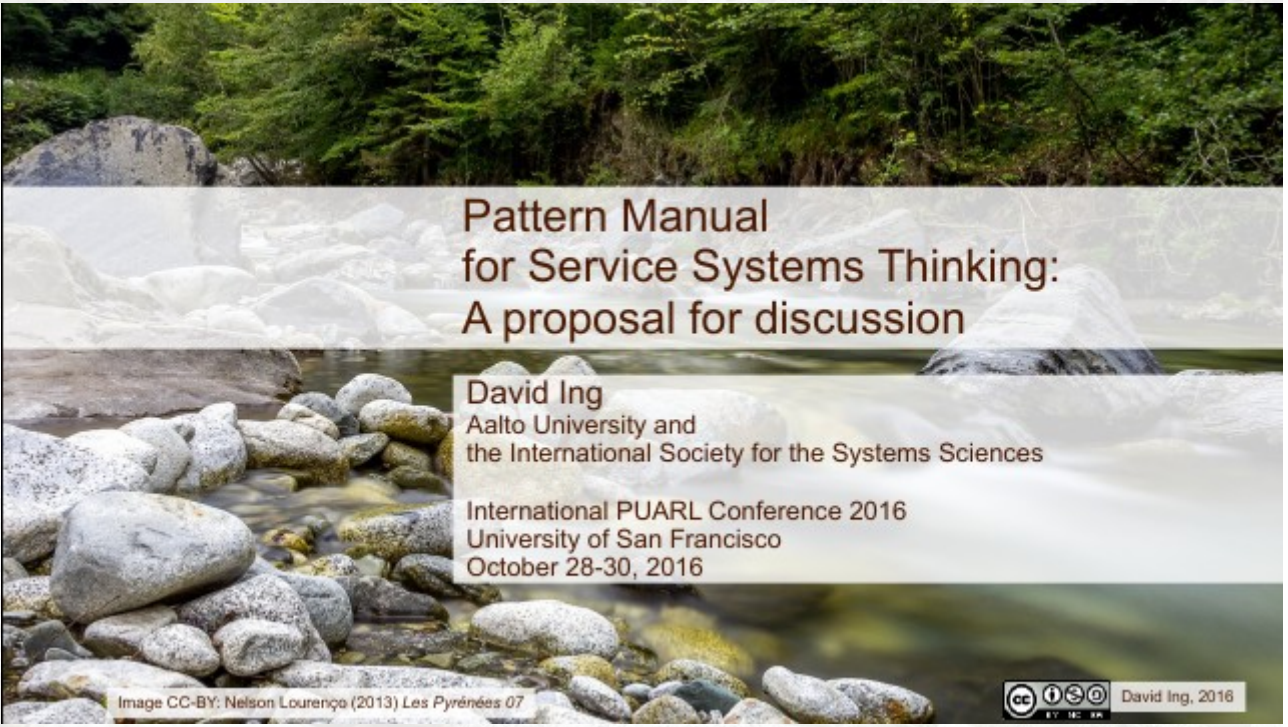
Essentially the **Dialectic is an adverserial problem forming methodology especially suited to treating intensely ill-structured**, i.e., difficult-to-define, **issues**. It does this by attempting to set up at least two very different (antithetical) and maximally challenging views (definitions, policies) of a problem situation so that everything that one view takes for granted as a basic and reasonable assumption, the other challenges as intensely as it can.

[….]

The intent is … to allow the manager to take advantage of a turbulent environment and thereby to convert a problematic situation into an opportunity.

Ian I. Mitroff, James R. Emshoff, and Ralph H. Kilmann. 1979. “Assumptional Analysis: A Methodology for Strategic Problem Solving.” *Management Science*, 583–593. doi:10.1287/mnsc.25.6.583.

Pattern Manual for Service Systems Thinking: A proposal for discussion (PUARL 2016)



Pattern Manual for Service Systems Thinking: A proposal for discussion

David Ing, Aalto University and the International Society for the Systems Sciences, coevolving@gmail.com

Abstract:

What is properly required to take the learning on generative pattern languages from the built environment and software development communities, to a world of service system thinking?

This position paper winds back to early days of Center for Environmental Studies, and presents an alternative view on the 1968 Multi-Service Center work, informed by 21st century developments in service systems science. The conventional format for a pattern language has settled into a three-part rule of relations between context, problem and solution. An alternative format of (i) voices on issues (who + what), (ii) affording value(s) (how + why), and (iii) spatio-temporal frames (where + when) is proposed, with a straw man example.

Methods from the 1985 Eishin campus project, published in 2012, are compared against practices that have become common in agile development.

The conceptual shifts from built environment to service systems thinking are expressed as (i) amplifications, (ii) rephilosophizations, and (iii) reinterpretations. The generation and legitimization of pattern languages is considered across a community, with a shift from publishing in books on paper to collaborating with online technologies such as wiki.

At the 2014 PLoP and the 2015 PURPLSOC conferences, the idea of extending the pattern language for environment structure into a new domain of service systems thinking was introduced. In 2016, this idea has been further developed as a baseline for further discussion.

Keywords: *service systems; systems thinking; issue-seeking; interactive value; wayfaring*

Agenda

1. What is multiparadigm inquiry?

2. Where have (and might have) (1960s-2010s) paradigms influenced generative pattern language?

3. Why might a pattern language project or community pay more attention to its paradigm?

Image CC-BY: Nelson Lourenço (2013) *Les Pyrénées 07*