Ways That Meaning Comes Together:
Root Metaphors, Relational Systems, and Enduring Economies

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CANSEE – Canadian Society for Ecological Economics
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Image CC-BY Mike Cassano (2009) *Most Interesting Pothole*

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Agenda

A.	Group Introductions • Your system of interest, in ecological economics	0:00 – 0:15
B.	Emerging Processual-Relational Approach • Sustainability Transformations	0:15 – 0:20
C.	Systems Theory ← World Hypotheses • Root Metaphor Theory	0:20 – 0:35
D.	Group Exercise: Reframing the Tide • Some World Hypotheses via Gen AI	0:35 – 1:10
E.	Group Reflections • Meaning: Scope + Precision	1:10 – 1:30

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What is your (economic) system of interest?

1. Your name?

2. How did you come to ecological economics?

3. What is the economic system of interest that you would like to change (or not change)?

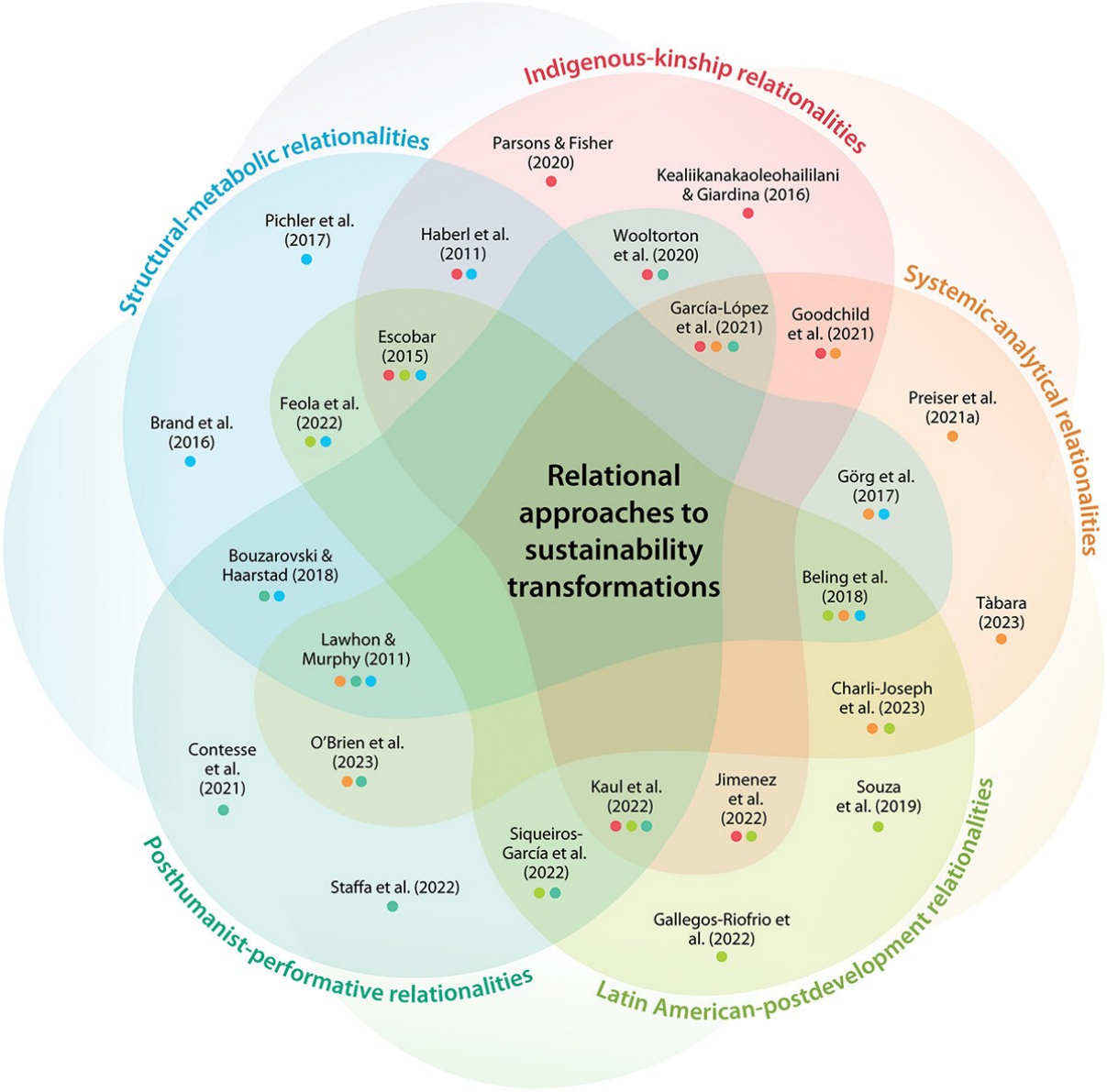
4. (Group work later, note the systems of interest of others)

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B. Emerging Processual-Relational Approach (page 1 of 3) …

Sustainability transformations may involve many ways of knowing, being, and doing

"… **relational approaches** enact alternatives to **separable categories of society and nature**, emphasise unfolding relations between **human and non-human beings**, and highlight the importance of **ethical responsibilities and care** for these relationships"

West, Simon, et al. "Relational Approaches to Sustainability Transformations: Walking Together in a World of Many Worlds." *Ecosystems and People*, vol. 20, no. 1, Dec. 2024, p. 2370539. https://doi.org/10.1080/26395916.2024.2370539 .

October 2026

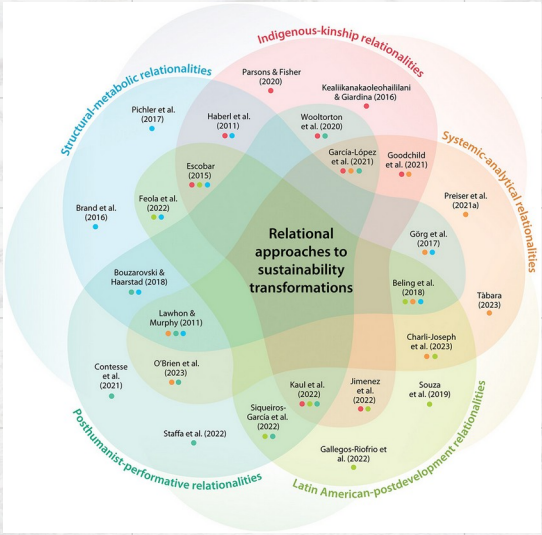
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B. Emerging Processual-Relational Approach (page 2 of 3) …

Clusters on “relational” and “relationality” alongside “transformations” and “sustainability” were interpreted in 5 conceptual groupings inductively

	Indigenous-kinship relationalities	Systemic-analytical relationalities	Posthumanist-performative relationalities	Structural-metabolic relationalities	Latin American-postdevelopment relationalities
Human-nature connectedness					
Agency and leadership					
Scale and scaling					
Time and change					
Knowledge and action					



“We recognise that because of our inductive approach rooted in our own experiences and positionality, and the inherently interpretive nature of conceptual groupings, these five relationalities are only one way of making sense of a complex set of discussions, and that there are many other ways of doing so.”

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Approaches to systems of interest have traditions via (i) Human Social Systems Theory, or (ii) General Systems Theory

Systems	Stakeholders: Unitary	Stakeholders: Pluralist	Stakeholders: Coercive
Complex	• Complexity Theory • Network Analysis	• Multi-methodology • Critical Systems Practice	• Critical Systems Heuristics • Total Systems Intervention
Complicated	• System Dynamics • Viable Systems Model • Org Cybernetics	• Soft Systems Methodology	• Emancipatory Systems Approaches
Simple	• Operations Research • Systems Engineering • Systems Analysis	• Interactive Planning • Strategic Assumption Surfacing and Testing	• Social Systems Design • Social Cybernetics

Jackson, Michael C. 2019. *Critical Systems Thinking and the Management of Complexity*. John Wiley & Sons.

9. **Transcendental**: unknowables
8. **Social Orgs**: symbolic images
7. **Humans**: self-consciousness
6. **Animals**: mobility, teleology
5. **Plants**: genetic-social
4. **Cells**: self-maintaining life
3. **Thermostats**: control mechanism
2. **Clockworks**: predetermined motion
1. **Frameworks**: static structures

Boulding, Kenneth E. 1956. "General Systems Theory -- The Skeleton of Science." *Management Science* 2 (3): 197–208. https://doi.org/10.1287/mnsc.2.3.197.

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American pragmatism, a theory of knowledge based in doubt, builds adequate evidence as a *World Hypothesis* approaches a *Theory*

What I call the **root metaphor theory** is the theory that **a world hypothesis** to cover all facts is **framed** in the first instance on the basis of **a rather small set of facts** and **then expanded** in reference so as to cover all facts. The set of facts which inspired the hypothesis is the original root metaphor

(p. 369).

This root metaphor theory, "**whether the theory be correct in fact or not**", was offered "as **a useful instrument for the clarification of a confused field**" in metaphysics

(p. 374).

Pepper, Stephen C. "The Root of Metaphor Theory of Metaphysics." *The Journal of Philosophy*, vol. 32, no. 14, 1935, pp. 365–74. https://doi.org/10.2307/2016759.

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Each world hypothesis is a system of knowledge, with a root metaphor at its core, built on four maxims (principles)

Maxim I:
A world hypothesis is determined by its root metaphor.
In application, several systems theories could be based on a shared root metaphor.

Maxim II:
Each world hypothesis is autonomous.
A systems theory should be independently judged on adequacy by the reliability in its corroboration of evidence within. A systems theory should stand on its own evidence, and not on the shortcomings of an alternative theory.

Maxim III:
Eclecticism is confusing.
Systems theories are mutually exclusive from each other, based on different root metaphors. Mixing metaphors can introduce conflicting facts, leading to contradiction and a reduction of reliability.

Maxim IV:
Concepts which have lost contact with their root metaphors are empty abstractions.
A systems theory can grow old, so that associated abstractions get taken for granted. Rejuvenation comes through tracing evidence back to the root metaphor.

Pepper, Stephen C. “Root Metaphors.” *World Hypotheses*, University of California Press, 1942, pp. 84–114, https://doi.org/10.1525/9780520341869.

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Pepper described six world hypotheses, of which four were judged to be relatively adequate with sufficient precision and scope

	Dispersive manner for organizing evidence	***Integrative*** manner for organizing evidence
Analytic mode of reasoning	**Formism** *Root metaphor*: **Similarity**, as recurrence or recognizable features *Example*: An oak tree, while conditions may vary so each is distorted from the norm	**Mechanism** *Root metaphor*: **Machine**, where exerting force or energy produces predictable outcomes *Example*: A tree stump puller, with a lever (bar with fulcrum)
Synthetic mode of reasoning	**Contextualism** *Root metaphor*: **Situation**, as a historic event in its living actuality *Example*: A live performance with a solo improvisation by a musician with band members co-responding	**Organicism** *Root metaphor*: **Constructive Development**, with orderliness of changes from stage to stage *Example*: A living being with a progressive experience continuing as an integrated whole

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The features of the four world hypotheses underscore distinctiveness in the appreciation of coherent systems types

	Dispersive manner for organizing evidence	***Integrative*** manner for organizing evidence
Analytic mode of reasoning	**Formism** *Root metaphor*: **Similarity**, as recurrence or recognizable features *Theory of truth*: **Correspondence** between (an) instance(s) and a likened ideal *Categories*: **Characterizations** (of qualities and relations) *Nature of time*: **Universal or irrelevant**.	**Mechanism** *Root metaphor*: **Machine**, where exerting force or energy produces predictable outcomes *Theory of truth*: **Causal adjustment** to a mature nominalism (i.e. named response to stimulus) *Categories*: **Primary qualities** (effectual aspects) and **secondary perception** (symbols in the mind) *Nature of time*: **Schematic time** as location (linear and dimensional)
Synthetic mode of reasoning	**Contextualism** *Root metaphor*: **Situation**, as a historic event in its living actuality *Theory of truth*: **Operationalism**, via qualitative confirmation of solving a specific problem *Categories*: **Strands, texture, quality, novelty** *Nature of time*: **Qualitative duration**, **event** relative to a specious present	**Organicism** *Root metaphor*: **Constructive Development**, with orderliness of changes from stage to stage *Theory of truth::*: **Coherence**, where fragments cohere with their nexus, free of contradiction *Categories*: **Progression** (steps), **final outcome** (ideal) *Nature of time*: **Directional arrow**, successive integrations

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The analytic-synthetic modes and dispersive-integrative manners are ontologically grounded in the stability of Western substance philosophy

	Dispersive manner for organizing evidence	***Integrative*** manner for organizing evidence
Analytic mode of reasoning	**Formism** *Root metaphor*: **Similarity**, as recurrence or recognizable features	**Mechanism** *Root metaphor*: **Machine**, where exerting force or energy produces predictable outcomes
Synthetic mode of reasoning	**Contextualism** *Root metaphor*: **Situation**, as a historic event in its living actuality	**Organicism** *Root metaphor*: **Constructive Development**, with orderliness of changes from stage to stage

	Dispersive manner for organizing evidence	***Integrative*** manner for organizing evidence
Analytic mode of reasoning	**Formism** **Analytic**: parts in relations are presumed; each whole is inferred. **Dispersive**: unpredictability (non-determinism) is presumed; determinate order is denied.	**Mechanism** **Analytic**: parts in relations are presumed; each whole is inferred. **Integrative**: determinate order is presumed; unpredictability (non-determinism) is denied.
Synthetic mode of reasoning	**Contextualism** **Synthetic**: wholes are presumed; parts in relations are inferred. **Dispersive**: unpredictability (non-determinism) is presumed; determinate order is denied.	**Organicism** **Synthetic**: wholes are presumed; parts in relations are inferred. **Integrative**: determinate order is presumed; unpredictability (non-determinism) is denied.

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A new World Hypothesis is proposed as (Con)texturalism-Dyadicism, embracing both dispersive and integrative manners

Synthetic mode of reasoning	***Dispersive*** manner for organizing evidence	***Integrative*** manner for organizing evidence
	Contextualism: *Root metaphor*: **Situation**, as a historic event in its living actuality *Theory of truth*: Operationalism, via qualitative confirmation of solving a specific problem *Categories*: Strands, texture, quality, novelty *Nature of time*: Qualitative duration, event relative to a specious present	**Organicism** *Root metaphor*: **Constructive Development**, with orderliness of changes from stage to stage *Theory of truth*: Coherence, where fragments cohere with their nexus, free of contradiction *Categories*: Progression (steps), final outcome (ideal) *Nature of time*: Directional arrow, successive integrations
	(Con)texturalism-Dyadicism: *Root metaphor*: **YinQi ⇌ YangQi dancing through [eight] seasons**, as ((YinQi) ∝ 1/(YangQi)) wayfaring in unfolding wanwu [dissipating ⇌ concentrating] textures *Theory of truth*: Entailment, traceability back through history, with anticipated outcomes indetermined *Categories*: Rhythmic shifts in (con)textures, situational propensity, dyadic diachrony *Nature of time*: Kairotic, with propitious periods and inopportune periods	
	Dispersive + integrative manner for organizing evidence	

Interpret the double harpoon as reversibility in chemistry: (YinQi ⇌ YangQi) == (YinQi is complementary with YangQi).

Interpret the math symbol ∝ not as alpha: (YinQi ∝ 1/(YangQi)) == (YinQi is inversely proportional with YangQi).

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D. Group Exercise: Reframing the Tide (page 1 of 13) …

Should we consider changes in ecologies + economies by features based in the metaphilosophy of Root Metaphor Theory?

	Ways that Meaning Comes Together							
Feature								
Root Metaphor								
Criteria of Adequacy / Validity (Theory of Truth)								
Primary Distinctions (Categories)								
Nature of Time								
Research Sources								

Note from David Ing: "Ways that Meaning Comes Together" might also be expressed by William James as "Ways that Phenomena Hang Together". This might have been called "Modes of Appreciation", or "Styles of Coherence across Experiences" by Stephen C. Pepper, that may or may not be less helpful that the "World Hypotheses" that he chose.

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Prompts on Root Metaphor Theory → 8 hours: Gemini, Qwen, and Copilot

I would like to extend the research that I have already conducted into Root Metaphor Theory, as developed by Stephen C. Pepper. This would apply the Root Metaphor Theory framework to produce (i) a set of detailed artifacts, and (ii) a summary artifact. These artifacts are presented as tables, to ease understanding and comparability. The rows of a table are the features of each World Hypothesis. The columns of a table are "Ways that Meaning Comes Together", as a proposed World Hypothesis that might be better validated in a workshop.

First I would like to verify that you have knowledge of, or access to, academic sources. If you do not already have these sources available to you, let me know, and I can provide a set of specific references. I can provide the academic sources via upload(s).

The first set of academic sources relate to Root Metaphor Theory and World Hypotheses, that would aid with structuring the rows. Under the heading row, the four rows are (i) Root Metaphor; (ii) Criteria of adequacy or validity (that research papers by Ing have labelled as "Theory of truth"); (iii) Primary distinctions and relations (that the research papers by Ing have labelled as "Categories"); and (iv) Nature of Time. The fifth row of the table would cite the researchers in the "Example research sources".

Are you familiar with:
(i) Pepper, Stephen C. “The Root of Metaphor Theory of Metaphysics.” The Journal of Philosophy, vol. 32, no. 14, 1935, pp. 365–74. JSTOR, https://doi.org/10.2307/2016759.
(ii) Pepper, Stephen C. “Root Metaphors.” World Hypotheses, University of California Press, 1942, pp. 84–114, https://doi.org/10.1525/9780520341869.
(iii) Pepper, Stephen C. “Metaphor in Philosophy.” The Journal of Mind and Behavior, vol. 3, no. 3/4, 1982, pp. 197–205.
(iv) Ing, David, and Susu Nousala. “Rethinking Work, with the Pandemic Disruption: Metatheorizing with World Hypotheses and Systems Changes.” International Journal of Organization Theory & Behaviour, vol. 28, no. 2, Feb. 2025, pp. 161–83. https://doi.org/10.1108/IJOTB-02-2023-0036.
(v) Ing, David, and Gary Metcalf. “Reframing Systems Thinking for Systems Changes: Sciencing and Philosophizing from Pragmatism towards Processes as Rhythms.” Journal of the International Society for the Systems Sciences, vol. 67, 2023. https://journals.isss.org/index.php/jisss/article/view/4154.

Specify which references you don't know, and I will upload them.

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Columns 1 are features; 2, 3 included Systems Thinking, First Nations

The first set of artifacts are a series of extended tables, one for each of the proposed "Ways that Meaning Comes Together". Each table has the same format of (i) four rows of features of World Hypotheses, and (ii) the second column an expansion of the column of the proposed "Ways that Meaning Comes Together".

The concluding summary artifact provides a concise (shorter) description in each cell. This summary artifact combines all of the "Ways the Meaning Comes Together" columns into a single table, with (i) four rows of the features of World Hypothesis, and a fifth row of "Example research sources"; and (ii) columns of each of the proposed "Ways that Meaning Comes Together".

When I have completed the full list of "Ways that Meaning Comes Together", I will say "Inputs complete. Proceed with creating the brief summary table".

Do you understand these instructions for creating the tables? Let me know if you require clarifications, and then we can proceed.

The second set of academic sources that is a second column after the heading column relate to a "Way that Meaning Comes Together" with "20th Century Systems Thinking (from Ancient Greek through Enlightment)".

Are you familiar with:
(i) Churchman, C. West, and Russell Lincoln Ackoff. “Modern Synthesis: The Pragmatic Method.” Methods of Inquiry: An Introduction to Philosophy and Scientific Method, Educational Publishers, 1950, pp. 193–258. HathiTrust, https://catalog.hathitrust.org/Record/005757861.
(ii) Churchman, C. West. “Singerian Inquiring Systems: Progress.” The Design of Inquiring Systems: Basic Concepts of Systems and Organization, Basic Books, 1971, pp. 186–205. https://archive.org/details/designofinquirin0000chur.(iii) “Unbounded Systems Thinking: The Fifth Way of Knowing.” The Unbounded Mind: Breaking the Chains of Traditional Business Thinking, by Ian I. Mitroff and Harold A. Linstone, Oxford University Press, 1993, pp. 85–110. http://doi.org/10.1093/acprof:oso/9780195102888.001.0001.
(iv) Britton, G. A., and H. McCallion. “An Overview of the Singer/Churchman/Ackoff School of Thought.” Systemic Practice and Action Research, vol. 7, no. 5, 1994, pp. 487–521. https://doi.org/10.1007/BF02173378.

Specify which references you don't know, and I will upload them.

The third set of academic sources that is a third column after the heading column relate to a "Way that Meaning Comes Together" with "Relational Systems Thinking (Anishinaabe, First Nations)".

Are you familiar with:
(i) Goodchild, Melanie. “Relational Systems Thinking: That’s How Change Is Going to Come, From Our Earth Mother.” Journal of Awareness-Based Systems Change, vol. 1, no. 1, Feb. 2021, pp. 75–103. https://doi.org/10.47061/jabsc.v1i1.577.
(ii) Goodchild, Melanie. “Relational Systems Thinking: The Dibaajimowin (Story) of Re-Theorizing ‘Systems Thinking’ and ‘Complexity Science.’” Journal of Awareness-Based Systems Change, vol. 2, no. 1, May 2022, pp. 53–76. https://doi.org/10.47061/jabsc.v2i1.2027.
(iii) Goodchild, Melanie. “Writing from a Relational Systems Thinking Standpoint: A Commentary.” Journal of Awareness-Based Systems Change, vol. 4, no. 1, May 2024, pp. 11–18. https://doi.org/10.47061/jasc.v4i1.8121.
(iv) Goodchild, Melanie. Niigani Miinigowiziiwin (We Give These Gifts to the Future). 2023. University of Waterloo, Ph.D. dissertation. http://hdl.handle.net/10012/19698.
(v) West, Simon, et al. “A Relational Turn for Sustainability Science? Relational Thinking, Leverage Points and Transformations.” Ecosystems and People, vol. 16, no. 1, Jan. 2020, pp. 304–25. https://doi.org/10.1080/26395916.2020.1814417.
(vi) West, Simon, et al. “Relational Approaches to Sustainability Transformations: Walking Together in a World of Many Worlds.” Ecosystems and People, vol. 20, no. 1, Dec. 2024, p. 2370539. https://doi.org/10.1080/26395916.2024.2370539.

Specify which references you don't know, and I will upload them.

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Columns 4, 5 included Navajo-Hopi, Autochthous Ubuntu,

The fourth set of academic sources that is a fourth column after the heading column relate to a "Way that Meaning Comes Together" with "Native Science (Hózhǫ́) Harmony and Balance (Navajo-Hopi, Native American)"

(i) Haskie, Miranda Jensen. “Living Holistically: Practicing the Navajo Principles of Hózhǫ́ and K’é.” Holistic Education Review, vol. 3, no. 1, May 2023. https://her.journals.publicknowledgeproject.org/index.php/her/article/view/2662.(ii) Kahn-John, Michelle. “Concept Analysis of Diné Hózhó: A Diné Wellness Philosophy.” Advances in Nursing Science, vol. 33, no. 2, June 2010, p. 113. https://doi.org/10.1097/ANS.0b013e3181dbc658.(iii) Kahn-John, Michelle, and Mary Koithan. “Living in Health, Harmony, and Beauty: The Diné (Navajo) Hózhó Wellness Philosophy.” Global Advances in Health and Medicine, vol. 4, no. 3, May 2015, pp. 24–30. https://doi.org/10.7453/gahmj.2015.044.(iv) Cajete, Gregory. Native Science : Natural Laws of Interdependence. Clear Light Publishers, 2000. http://archive.org/details/nativesciencenat0001caje.(iv) Cajete, Gregory A. “American Indian Epistemologies.” New Directions for Student Services, vol. 2005, no. 109, 2005, pp. 69–78. https://doi.org/10.1002/ss.155.

Specify which references you don't know, and I will upload them.

The fifth set of academic sources that is a fifth column after the heading column relate to a "Way that Meaning Comes Together" with "Autochthous (Ubuntu, African)".

(i) Chibvongodze, Danford T. “Ubuntu Is Not Only about the Human! An Analysis of the Role of African Philosophy and Ethics in Environment Management.” Journal of Human Ecology, vol. 53, no. 2, Feb. 2016, pp. 157–66. https://doi.org/10.31901/24566608.2016/53.02.09. Cached at https://www.researchgate.net/profile/Danford-Tafadzwa-Chibvongodze-2/publication/299445262_Ubuntu_is_Not_Only_about_the_Human_An_Analysis_of_the_Role_of_African_Philosophy_and_Ethics_in_Environment_Management/links/56f7e4c708ae7c1fda30708d/Ubuntu-is-Not-Only-about-the-Human-An-Analysis-of-the-Role-of-African-Philosophy-and-Ethics-in-Environment-Management.pdf
(ii) Chilisa, Bagele. “Decolonising Transdisciplinary Research Approaches: An African Perspective for Enhancing Knowledge Integration in Sustainability Science.” Sustainability Science, vol. 12, no. 5, Sept. 2017, pp. 813–27. https://doi.org/10.1007/s11625-017-0461-1.
(iii) Adyanga, Francis Akena, and Norma Ruth Arlene Romm. “Researching Indigenous Science Knowledge Integration in Formal Education: Interpreting Some Perspectives from the Field.” International Journal of Educational Development in Africa, vol. 3, no. 1, 2016, p. 14 pages. https://doi.org/10.25159/2312-3540/2696.
(iv) Romm, Norma R. A. “An Indigenous Relational Approach to Systemic Thinking and Being: Focus on Participatory Onto-Epistemology.” Systemic Practice and Action Research, vol. 37, no. 6, Dec. 2024, pp. 811–42. https://doi.org/10.1007/s11213-024-09672-4.
(v) Ijatuyi, Enioluwa Jonathan, et al. “Integration of Indigenous Knowledge with Scientific Knowledge: A Systematic Review.” Environmental Science & Policy, vol. 170, Aug. 2025, p. 104119. https://doi.org/10.1016/j.envsci.2025.104119.

Specify which references you don't know, and I will upload them.

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D. Group Exercise: Reframing the Tide (page 5 of 13) …

Columns 6, 7 included Nordic + Inuit, Chinese Classical Yinyang

The sixth set of academic sources that is a sixth column after the heading column relate to a "Way that Meaning Comes Together" with "Nordic + Inuit".

(i) Ingold, Tim. “Up, across and Along.” Lines: A Brief History, Routledge, 2007, pp. 72–103. Google Books, https://doi.org/10.4324/9780203961155.
(ii) Ingold, Tim. “Rethinking the Animate, Reanimating Thought.” Being Alive: Essays on Movement, Knowledge and Description, Routledge, 2011, pp. 67–75. https://doi.org/10.4324/9780203818336.
(iii) Ingold, Tim. “Against Space: Place, Movement, Knowledge.” Being Alive: Essays on Movement, Knowledge and Description, Routledge, 2011, pp. 145–55. https://doi.org/10.4324/9780203818336.
(iv) Ingold, Timothy. “Anthropology beyond Humanity.” Suomen Antropologi: Journal of the Finnish Anthropological Society, vol. 38, no. 3, 2013, pp. 5–23. Cached at https://anthropological.cloud/wau/wcaa/archive/downloads/wcaa/dejalu/feb_2015/ingold.pdf
(v) Anderson, David G., et al. “Architectures of domestication: on emplacing human-animal relations in the North.” Journal of the Royal Anthropological Institute, vol. 23, no. 2, 2017, pp. 398–416. https://doi.org/10.1111/1467-9655.12613_1.
(vi) Ingold, Tim. “The North Is Everywhere.” Knowing from the Indigenous North, Routledge, 2018, pp. 108–19, https://doi.org/10.4324/9781315179834-8.

Specify which references you don't know, and I will upload them.

The seventh set of academic sources that is a seventh column after the heading column relate to a "Way that Meaning Comes Together" with "Chinese Classical School of Naturalists (Yinyang)".

(i) Feng, Yu-Lan. “The Yin-Yang School and Early Chinese Cosmology.” A Short History of Chinese Philosophy, edited by Derk Bodde, Free Press 1966 edition, Macmillan, 1948, pp. 129–42. https://archive.org/details/in.ernet.dli.2015.260423.
(ii) Lee, Keekok. “The Yi: Yin Qi, Yang Qi, Yinyang, and the Yao-Gua Model.” The Philosophical Foundations of Classical Chinese Medicine: Philosophy, Methodology, Science, Lexington Books, 2017, pp. 131–51. Google Books, https://rowman.com/ISBN/9781498538886/The-Philosophical-Foundations-of-Classical-Chinese-Medicine-Philosophy-Methodology-Science.
(iii) Lee, Keekok. “Yinyang-Wuxing.” The Philosophical Foundations of Classical Chinese Medicine: Philosophy, Methodology, Science, Lexington Books, 2017, pp. 153–84. Google Books, https://rowman.com/ISBN/9781498538886/The-Philosophical-Foundations-of-Classical-Chinese-Medicine-Philosophy-Methodology-Science.
(iv) Lee, Keekok. “Ontology: Qi and Its Role in the Lattice of Inter-Weaving Key Concepts.” The Philosophical Foundations of Classical Chinese Medicine: Philosophy, Methodology, Science, Lexington Books, 2017, pp. 185–216. Google Books, https://rowman.com/ISBN/9781498538886/The-Philosophical-Foundations-of-Classical-Chinese-Medicine-Philosophy-Methodology-Science.
(v) Lee, Keekok. “Process Philosophy/Ontology.” The Philosophical Foundations of Classical Chinese Medicine: Philosophy, Methodology, Science, Lexington Books, 2017, pp. 185–216. Google Books, https://rowman.com/ISBN/9781498538886/The-Philosophical-Foundations-of-Classical-Chinese-Medicine-Philosophy-Methodology-Science.
(vi) Maciocia, Giovanni. “Yin-Yang.” The Foundations of Chinese Medicine: A Comprehensive Text, Elsevier Health Sciences, 2015, pp. 3–17.
(vii) Jullien, François. “Propensity (vs Causality).” From Being to Living: A Euro-Chinese Lexicon of Thought, translated by Michael Richardson and Krzysztof Fijalkowski, Sage Publications Ltd, 2015, pp. 1–6. https://doi.org/10.4135/9781526492739.
(viii) Jullien, François. “Introduction.” The Propensity of Things: Toward a History of Efficacy in China, translated by Janet Lloyd, Zone Books, 1995, pp. 11–21.
(ix) Jullien, François. “Relying on the Propensity of Things.” A Treatise on Efficacy: Between Western and Chinese Thinking, translated by Janet Lloyd, University of Hawaii Press, 2004, pp. 15–31. https://doi.org/10.1515/9780824843144.

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Columns 8, 9 included Islamic, Process-Relational Social Ecological

The eighth set of academic sources that is a eighth column after the heading column relate to a "Way that Meaning Comes Together" with "Islamic Civilizational Epistemology".

Sardar, Ziauddin. How Do You Know? Reading Ziauddin Sardar on Islam, Science and Cultural Relations. Edited by Ehsan Masood, Pluto Press, 2006, https://www.plutobooks.com/product/how-do-you-know/.
Sardar, Ziauddin. Islam, Postmodernism and Other Futures. Edited by Sohail Inayatullah and Gail Boxwell, Pluto Press, 2003, https://www.plutobooks.com/product/islam-postmodernism-and-other-futures/.
Bakar, Osman. Classification Of Knowledge In Islam: A Study In Islamic Philosophies Of Science. Islamic Texts Society, 1998. Originally published by Institute for Policy Research, 1992. Internet Archive, http://archive.org/details/OsmanBakarClassificationOfKnowledgeInIslamAStudyInIslamicPhilosophiesOfScienceIs.
Bakar, Osman. The History and Philosophy of Islamic Science. Islamic Texts Society, 1999. First published 1991 as Tawhid and Science for Secretariat for Islamic Philosophy and Science & Nurin Enterprise, Malaysia

Specify which references you don't know, and I will upload them.

The ninth set of academic sources that is a ninth column after the heading column relate to a "Way that Meaning Comes Together" with "Process-Relational Social Ecological Systems".

(i) Mancilla García, María, Tilman Hertz, Maja Schlüter, Rika Preiser, and Minka Woermann. 2020. “Ecology and Society: Adopting Process-Relational Perspectives to Tackle the Challenges of Social-Ecological Systems Research.” Ecology and Society 25 (1): 29. https://doi.org/10.5751/ES-11425-250129. Cached at https://papers.ssrn.com/sol3/Delivery.cfm/SSRN_ID4152646_code3153437.pdf?abstractid=4152646&mirid=1
(ii) Hertz, Tilman, Maria Mancilla Garcia, and Maja Schlüter. 2020. “From Nouns to Verbs: How Process Ontologies Enhance Our Understanding of Social-Ecological Systems Understood as Complex Adaptive Systems.” People and Nature 2 (2): 328–38. https://doi.org/10.1002/pan3.10079.
(iii) Mancilla García, María, Caroline Abunge, Salomão Olinda Bandeira, et al. 2024. “Exploring a Process-Relational Approach to Qualitative Research Methods for Sustainability Science.” People and Nature 6 (4): 1512–23. https://doi.org/10.1002/pan3.10667.
(iv) Hertz, Tilman, Anja Klein, Maria Mancilla García, and Maja Schlüter. 2025. “Transforming a World That Never Stands Still.” Ecosystems and People 21 (1): 2469859. https://doi.org/10.1080/26395916.2025.2469859.

Specify which references you don't know, and I will upload them.

Inputs complete. Proceed with creating the brief summary table

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Future research could compare a variety of alternative epistemologies and ontologies on appreciating systems in each world

	Ways that Meaning Comes Together							
	20th Century Systems Thinking	Relational Systems Thinking (Anishinaabe, First Nations)	Native Science (Hózhǫ́, Navajo-Hopi)	Autochthous (Ubuntu, African)	Nordic + Inuit (Animic ontology)	Chinese Classical School of Naturalists (Yinyang)	Islamic Civilizational Epistemology	Process-Relational Social Ecological Systems
	Churchman, Ackoff, Mitroff, Linstone, Britton	Goodchild, West et al.	Haskie, Kahn-John, Koithan, Cajete	Chibvongodze, Chilisa, Adyanga, Romm, Ijatuyi	Ingold, Anderson et al.	Feng, Lee, Maciocia, Jullien	Sardar, Bakar	Mancilla García, Hertz, Schlüter

Note from David Ing: This proposed list of alternative ways of appreciating systems in the world is non-exhaustive.

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D. Group Exercise: Reframing the Tide (page 8 of 13) …

This first 4 of 8 ways of Ways that Meaning Comes Together was generated via Google Gemini Canvas Pro

	Ways that Meaning Comes Together			
	20th Century Systems Thinking	Relational Systems Thinking (Anishinaabe, First Nations)	Native Science (Hózhǫ́, Navajo-Hopi)	Autochthous (Ubuntu, African)
Root Metaphor	**The Purposeful System**: Entities progressing toward ultimate ideals.	**Kinship/Web of Life**: Humans and non-humans as entangled relatives.	**Harmony & Balance**: An interdependent system seeking equilibrium.	**Communitarian Interconnectedness**: "I am because we are" (Ubuntu).
Criteria of Adequacy / Validity	**Pragmatic Utility**: Validated by enabling progress and "sweeping in" views.	**Relational Accountability**: Validated via lived experience and story.	**Walking in Beauty**: Validated by maintaining/restoring balance.	**Participatory Onto-Epistemology**: Collectively and relationally negotiated.
Primary Distinctions	**Producer-Product**: Means/ends and pragmatic ideals.	**Inseparability**: Spirit, reciprocity, and responsibility.	**Spiritual Ecology**: Integration of physical, mental, and spiritual wellness.	**Eco-Spirituality**: Collective well-being and kinship.
Nature of Time	**Future-Oriented**: Teleological arrow toward a designed future.	**Cyclical**: Intergenerational (Seven Generations) and co-present.	**Rhythmic**: Fluid, tied to natural and ceremonial cycles.	**Polychronic**: Ancestral, defined by events and relationships.
Research Sources	Churchman, Ackoff, Mitroff, Linstone, Britton	Goodchild, West et al.	Haskie, Kahn-John, Koithan, Cajete	Chibvongodze, Chilisa, Adyanga, Romm, Ijatuyi

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D. Group Exercise: Reframing the Tide (page 9 of 13) …

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	Ways that Meaning Comes Together			
	Nordic + Inuit	Chinese Classical (Yinyang)	Islamic Civilizational	Process-Relational SES
Root Metaphor	**Wayfaring & Meshwork**: Fluid, interwoven lifelines and trails.	**Dynamic Interplay**: Continuous transformation of yin and yang.	**Divine Unity (Tawhid)**: Integrated creation with ethical stewardship.	**Continuous Becoming**: Fluid unfolding of networks (verbs over nouns).
Criteria of Adequacy / Validity	**Knowing as Going**: Validated via skilled practice and attentiveness.	**Efficacy & Propensity**: Sensing and aligning with natural unfolding (shi).	**Reason & Revelation**: Truth serves the public interest and ethics (haqq).	**Emergent Understanding**: Pragmatic, situated, and co-created.
Primary Distinctions	**Lines & Emplacement**: Movement, taskscapes, and animacy.	**Process Ontology**: Qi, continuous change, and the Five Phases.	**Holistic Knowledge**: Integration of physical/spiritual; moral boundaries.	**Processes & Intra-actions**: Fluid boundaries and emergence.
Nature of Time	**Taskscape**: Continuous flow tied to movement and seasons.	**Processual**: Rhythmic unfolding of yin/yang transformations.	**Teleological & Moral**: Rhythmic unfolding of a divine trust.	**Fluid Flow**: Active medium of emergence without static endpoints.
Research Sources	Ingold, Anderson et al.	Feng, Lee, Maciocia, Jullien	Sardar, Bakar	Mancilla García, Hertz, Schlüter

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D. Group Exercise: Reframing the Tide (page 10 of 13) …

This first 4 of 8 ways of Ways that Meaning Comes Together was generated via Qwen 3.5 Plus

	Ways that Meaning Comes Together			
	20th Century Systems Thinking	Relational Systems Thinking (Anishinaabe, First Nations)	Native Science (Hózhǫ́, Navajo-Hopi)	Autochthous (Ubuntu, African)
Root Metaphor	Inquiring system as historically situated, purposive, boundary-judging process (Churchman, 1971)	Land-water-sky relational nexus as living, storying, reciprocal process (Goodchild, 2023)	Cosmos as dynamic, ceremonial, interdependent web; Hózhó/K'é as harmony-kinship (Cajete, 2000)	Communal-cosmic relational nexus; "I am because we are" as ethical co-creation (Chilisa, 2017)
Criteria of Adequacy / Validity	Structural corroboration across inquiring modes; pragmatic workability; ethical reflexivity (Mitroff & Linstone, 1993)	Relational accountability; story coherence (dibaajimowin); practical wisdom (mino-bimaadiziwin) (Goodchild, 2024)	Ceremonial coherence; practical wisdom (Hózhóógo iiná); relational accountability (Kahn-John, 2015)	Relational accountability; communal validation; practical wisdom (botho/ubuntu); epistemic justice (Romm, 2024)
Primary Distinctions	Subject-object transaction; means-ends reciprocity; part-whole dialectic; fact-value entanglement; boundary critique (Britton & McCallion, 1994)	Human-more-than-human reciprocity; story-science complementarity; place-based universality; gift-economy logic; verb-based ontology (Goodchild, 2023)	Nested relational domains; clan kinship (Hak'eí); story-ceremony-science complementarity; reciprocity as cosmological law (Haskie, 2023)	Human-more-than-human kinship; spirituality-science complementarity; communal identity; verb-based ontology; participatory onto-epistemology (Chibvongodze, 2016)
Nature of Time	Historicist and teleological; retroductive-prospective; unbounded iterative inquiry (Churchman, 1971)	Cyclical-spiral and generational; ancestral continuity; future-gifting (niigani miinigowiziiwin) (Goodchild, 2023)	Cyclical-ceremonial and generational; seasonal rhythms; ancestral-future continuity (Cajete, 2000)	Cyclical-ancestral and generational; seasonal rhythms; ancestral continuity; future-gifting (Chilisa, 2017)
Research Sources	Churchman & Ackoff (1950); Churchman (1971); Mitroff & Linstone (1993); Britton & McCallion (1994)	Goodchild (2021, 2023, 2024); West et al. (2020, 2024)	Haskie (2023); Kahn-John (2010, 2015); Cajete (2000, 2005)	Chibvongodze (2016); Chilisa (2017); Romm (2024); Ijatuyi et al. (2025)

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D. Group Exercise: Reframing the Tide (page 11 of 13) …

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	Ways that Meaning Comes Together			
	Nordic + Inuit	Chinese Classical (Yinyang)	Islamic Civilizational	Process-Relational SES
Root Metaphor	Meshwork of wayfaring lines as animate, interdependent process; animic ontology (Ingold, 2011)	Dynamic yinyang interplay within qi field; shi (propensity) and wuxing phase-relationality (Lee, 2017)	Tawhidic cosmos as unified, hierarchical, ethically-teleological knowledge field (Bakar, 1998)	Social-ecological world as dynamic, relational, processual field of becoming (Mancilla García et al., 2020)
Criteria of Adequacy / Validity	Correspondence through skilled practice; animic resonance; wayfaring coherence; generational continuity (Ingold, 2018)	Correlative coherence; practical efficacy via shi; dynamic balance (he); processual resonance (Jullien, 2004)	Tawhidic coherence; revelatory warrant (naql); ethical-teleological efficacy; integrative synthesis (hikmah) (Bakar, 1999)	Relational coherence; methodological reflexivity; transformative resonance; pluralistic integration (Hertz et al., 2025)
Primary Distinctions	Wayfaring vs. transport; meshwork vs. network; animic vs. mechanistic; place as knot vs. space as container; correspondence vs. representation (Ingold, 2011)	Yinyang complementarity vs. dichotomy; qi as process vs. substance; wuxing as phase-relationality; shi vs. causality; correlative resonance (Lee, 2017)	Naql vs. ‘aql; sacred vs. profane sciences; hierarchy vs. fragmentation; ethical-teleological purpose; hikmah as integrative knowledge (Bakar, 1998)	Process vs. substance; relations vs. entities; verb-based vs. noun-based; entanglement vs. separation; emergence vs. prediction (Hertz et al., 2020)
Nature of Time	Rhythmic, generational, processual; duration of movement; seasonal cycles; world-in-formation (Ingold, 2011)	Cyclical-phase and processual-generative; seasonal rhythms; wuxing transformations; yinyang oscillation (Lee, 2017)	Teleological-cyclical and eschatological; directional purpose (maqasid); ritual rhythms; ultimate accountability (akhirah) (Bakar, 1999)	Processual, non-linear, transformative; medium of becoming; adaptation; co-evolution (Mancilla García et al., 2020)
Research Sources	Ingold (2007, 2011, 2018); Anderson et al. (2017)	Feng (1948/1966); Lee (2017); Maciocia (2015); Jullien (1995, 2004, 2015)	Sardar (2003, 2006); Bakar (1998, 1999)	Mancilla García et al. (2020, 2024); Hertz et al. (2020, 2025)

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D. Group Exercise: Reframing the Tide (page 12 of 13) …

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	Ways that Meaning Comes Together			
	20th Century Systems Thinking	Relational Systems Thinking (Anishinaabe, First Nations)	Native Science (Hózhǫ́, Navajo-Hopi)	Autochthous (Ubuntu, African)
Root Metaphor	Purposive system as coherent whole	Relations as primary; land and life as kin	Living harmony, balance, and beauty	Being-through-relation
Criteria of Adequacy / Validity	Pragmatic improvement of decisions	Relational accountability	Restoration of harmony	Relational flourishing
Primary Distinctions	Whole–part; means–ends	Kinship, reciprocity, responsibility	Harmony/imbalance; ceremony	Community, dignity, reciprocity
Nature of Time	Progressive, teleological	Ancestral–present–future continuity	Cyclical, ceremonial	Generational, world-forming
Research Sources	Churchman; Ackoff; Mitroff	Goodchild	Kahn-John; Cajete	Chibvongodze; Chilisa; Romm

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D. Group Exercise: Reframing the Tide (page 13 of 13) …

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	Ways that Meaning Comes Together			
	Nordic + Inuit (Wayfaring)	Chinese Classical Naturalists (Yinyang)	Islamic Civilizational Epistemology	Process-Relational SES
Root Metaphor	Life as wayfaring along lines	Correlative transformation of qi	Unity-in-multiplicity (tawḥīd)	Ongoing becoming of interdependent processes
Criteria of Adequacy / Validity	Attunement and correspondence	Efficacy via propensity (shi)	Ethical responsibility and stewardship	Responsible participation in transformation
Primary Distinctions	Movement, line, dwelling	Qi, yinyang, phases	Revealed/acquired knowledge; ethics	Process, relation, entanglement
Nature of Time	Processual, along-the-way	Diachronic, phasic	Continuity, renewal, accountability	Continuous, non-stationary
Research Sources	Ingold; Anderson et al.	Feng; Lee; Jullien	Sardar; Bakar	Mancilla García; Hertz

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Agenda

A.	Group Introductions • Your system of interest, in ecological economics	0:00 – 0:15
B.	Emerging Processual-Relational Approach • Sustainability Transformations	0:15 – 0:20
C.	Systems Theory ← World Hypotheses • Root Metaphor Theory	0:20 – 0:35
D.	Group Exercise: Reframing the Tide • Some World Hypotheses via Gen AI	0:35 – 1:10
E.	Group Reflections • Meaning: Scope + Precision	1:10 – 1:30

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World Hypotheses ← Scope + Precision

1. Has a root metaphor for your economic systems of interest come together for your group?

2. Have the AI summaries helped in discussing the scope and precision of the variety of root metaphors?

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