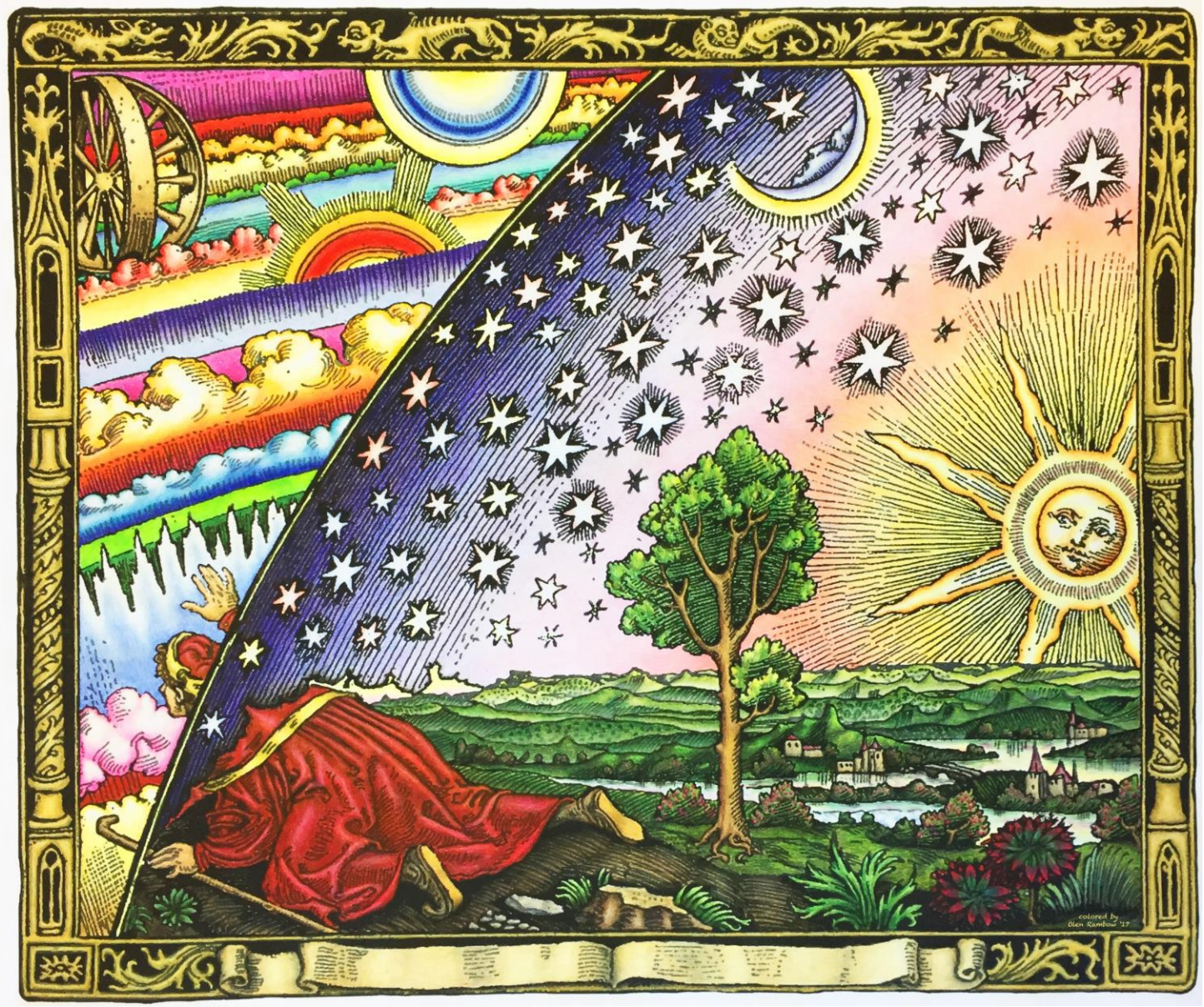
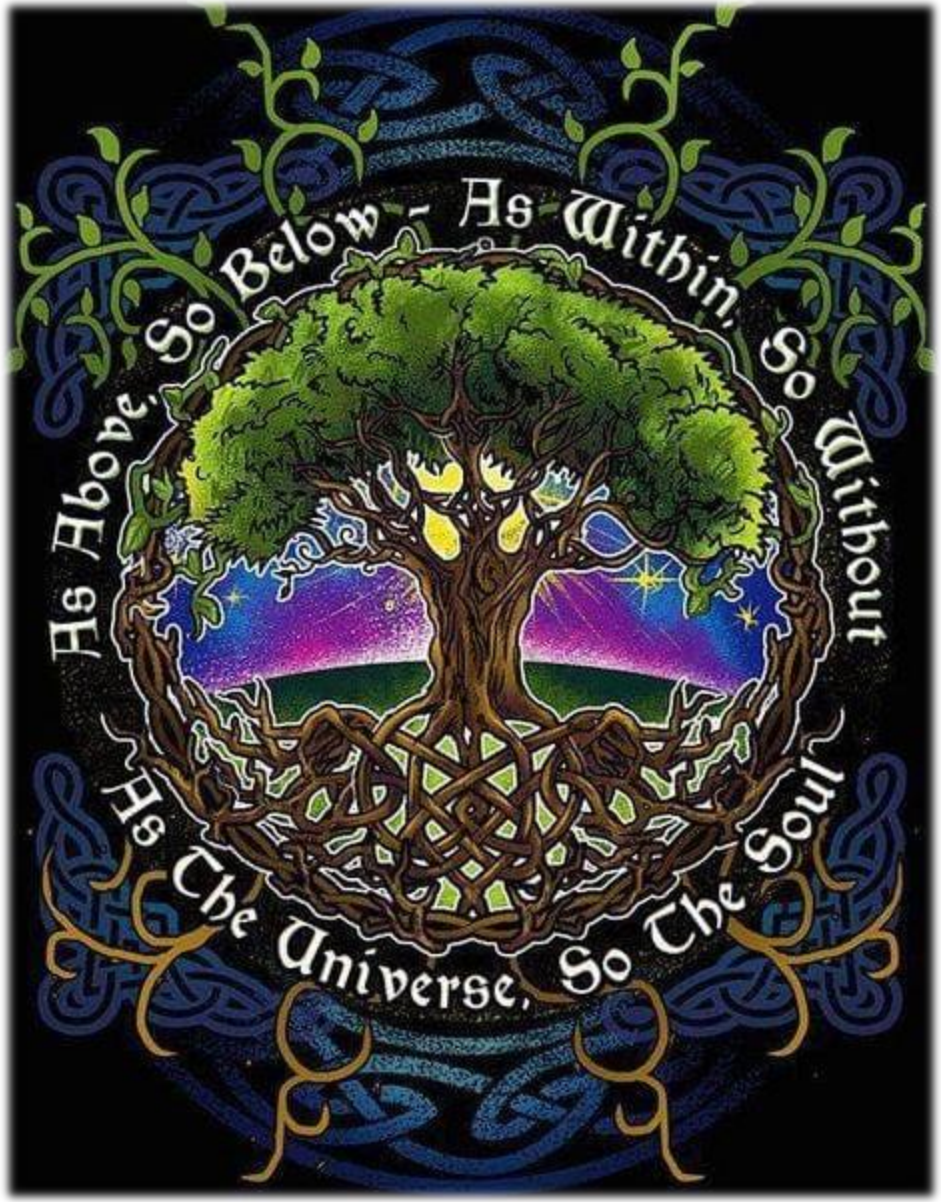
Science and Philosophy

08/29/2024

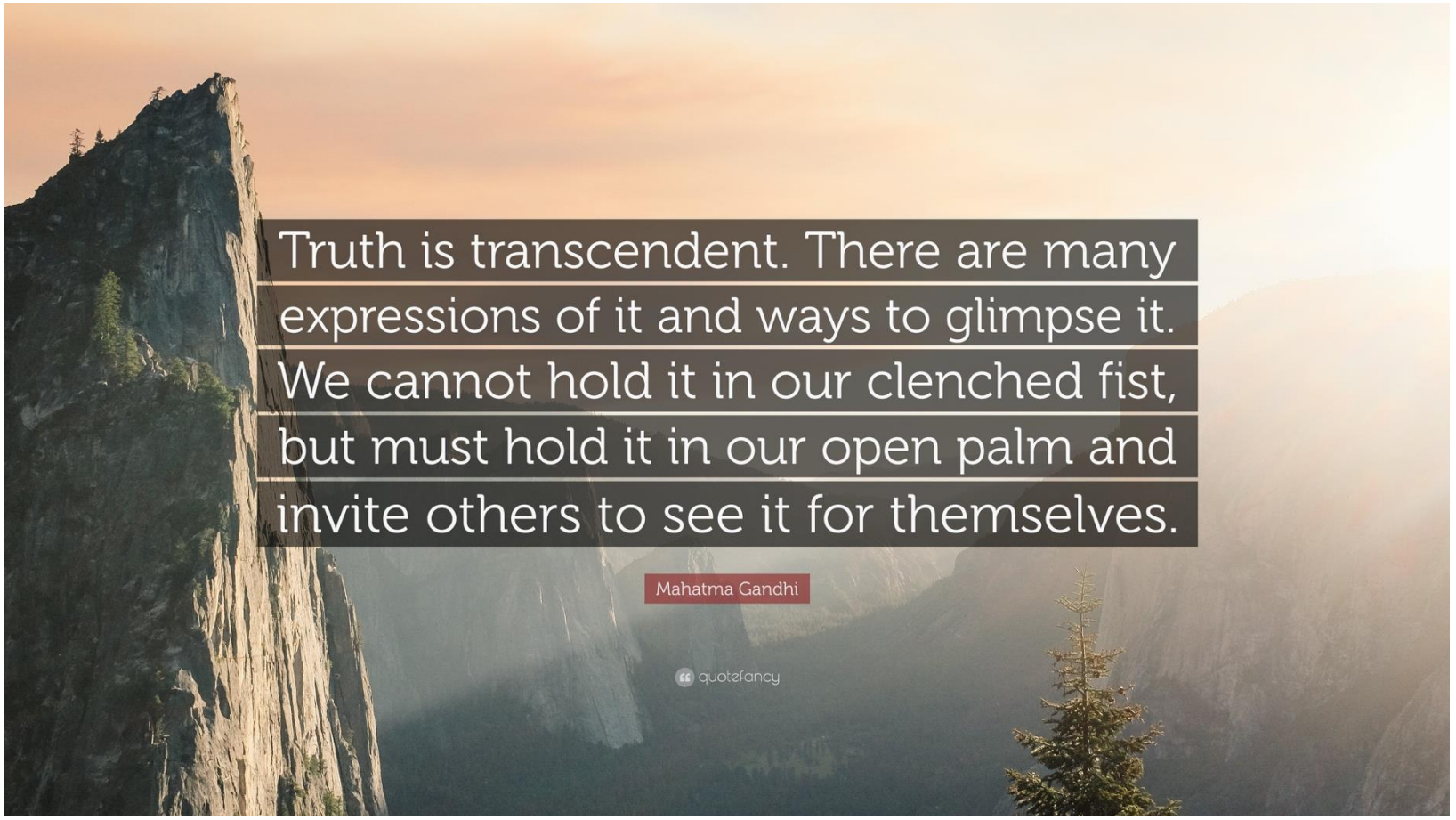


What are we doing when we do science?

- We are trying to understand the patterns of nature.
- Why is the world intelligible in the first place?
- Because our minds are built by nature.
- Our minds reflect the parts of nature that we inhabit.



Science is seeking truth



The transcendentals of the West

- **Truth** = correspondence between thought and reality.
  - *Transcends subject/object distinction*: Truth is seen as the alignment between what is thought (you) and what actually exists (what is beyond you), transcending the division between the thinker (subject) and the world (object)
- **Goodness** = the fulfillment of a being's nature and purpose.
  - *Transcends basic instincts*: Goodness is realized in the cultivation of virtues like courage, temperance, justice, and wisdom, that allow one to transcend base instincts like fear, selfishness, and craving
- **Beauty** = reflection of perfection, harmony, proportion, clarity.
  - *Transcends the imperfect nature of the physical world*: Beauty embodies an ideal form that evokes a sense of perfection, transcending the flawed and transient nature of the material world
- **Unity** = state of being one/whole/holy.
  - *Transcends division*: Unity represents the integration and coherence of all parts into a complete and undivided whole, whether in a physical, metaphysical, or spiritual context

Transcendentals throughout the world

All cultures rely on a vision of what is beyond them and greater than them to provide a sense of what is right and true

Chinese cosmology

- 阴阳 – Yin/yang: fundamental duality, ultimate unity
- 道 – Tao: divine order or way or flow
- 乂 – Qi: fundamental force of life
- 仁 – Ren: goodness, virtue
- 智 – Zhi: wisdom, knowledge

Hinduism

- सत्य – Satya: Truth
- ब्रह्मन् – Brahman: Ultimate reality
- कर्म – Karma: action and consequence
- संसार – Samsara: wandering cycle of life and existence
- मोक्ष – Moksha: liberation, Oneness with Brahman

Buddhism

- दुःख – Dukkha: unease, instability, suffering
- अनित्य – Anitya: fundamental impermanence of existence
- शून्यता – Sunyata: fundamental formlessness of existence
- निर्वाण – Nirvana: liberation from dukkha
- धर्म – Dharma: cosmic order

Indigenous traditions

- Community and kinship, cohesion and reciprocity
- Harmony with nature, interdependence of all things
- Oral wisdom tradition kept by elders
- Shamanistic dreams, visions of an imaginal reality that intersects us

Arabic traditions

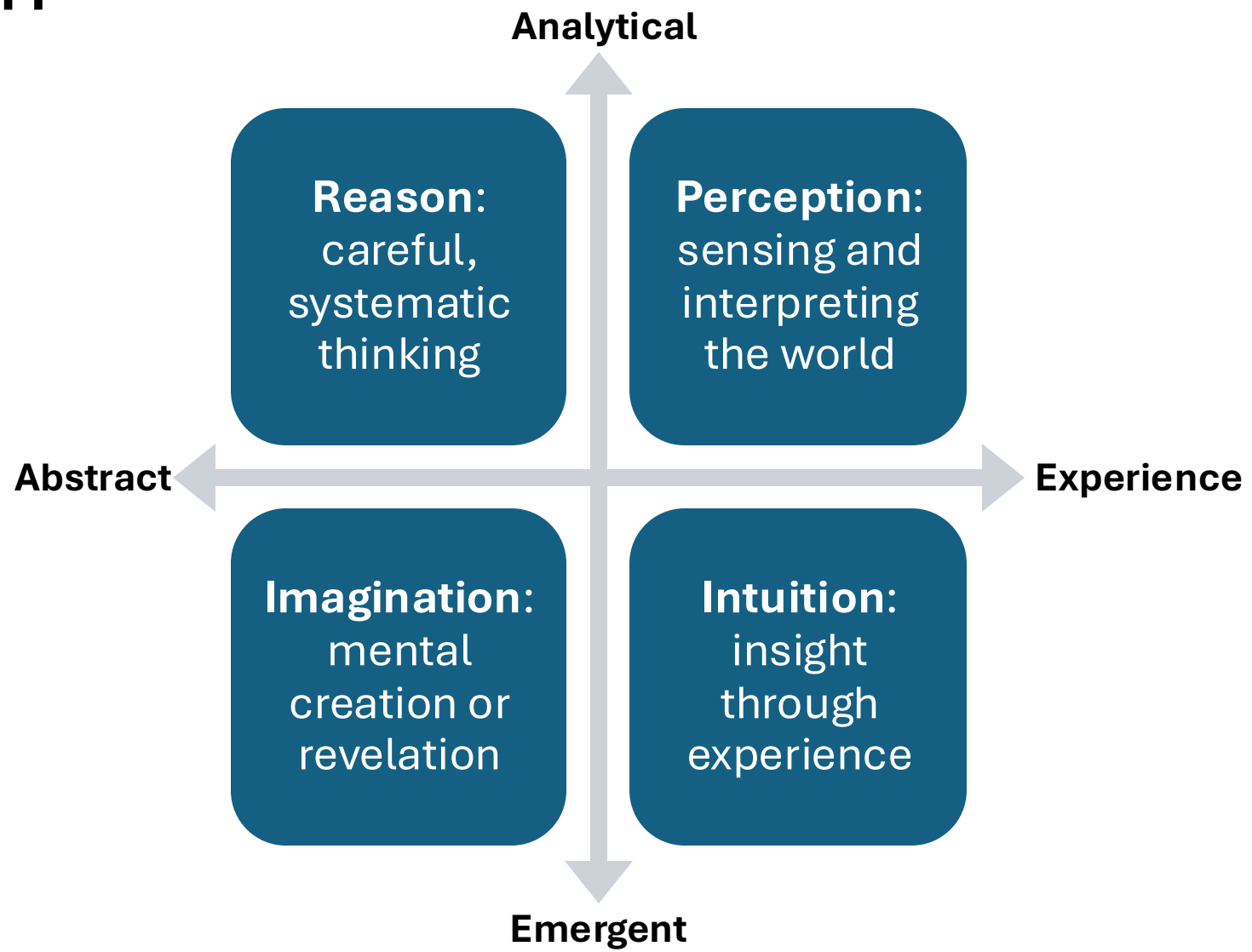
- قياس – qiyas: reasoning, analogy
- ماهية – mahiya: essence
- وجود – wujud: existence
- حقّ – ḥaqq: truth, right, reality

The transcendentals

- Science relies on the existence of transcendentals
- What is transcendent is beyond us mere mortals
- There will never be a perfect understanding of objective truth. *That is the point*.
  - But that doesn't mean it doesn't exist, either!
- Therefore, we can only ever strive towards truth, goodness, beauty, and unity.
- *It is like a finger that points to the Moon. Don't look at the finger, or you'll miss all the Heavenly Glory*

The pursuit of truth

- The pursuit of truth is multifaceted
- There is no one way to discover or understand it
- But not all paths are equal
- Different approaches reveal different aspects of reality
- Good science uses all faculties!



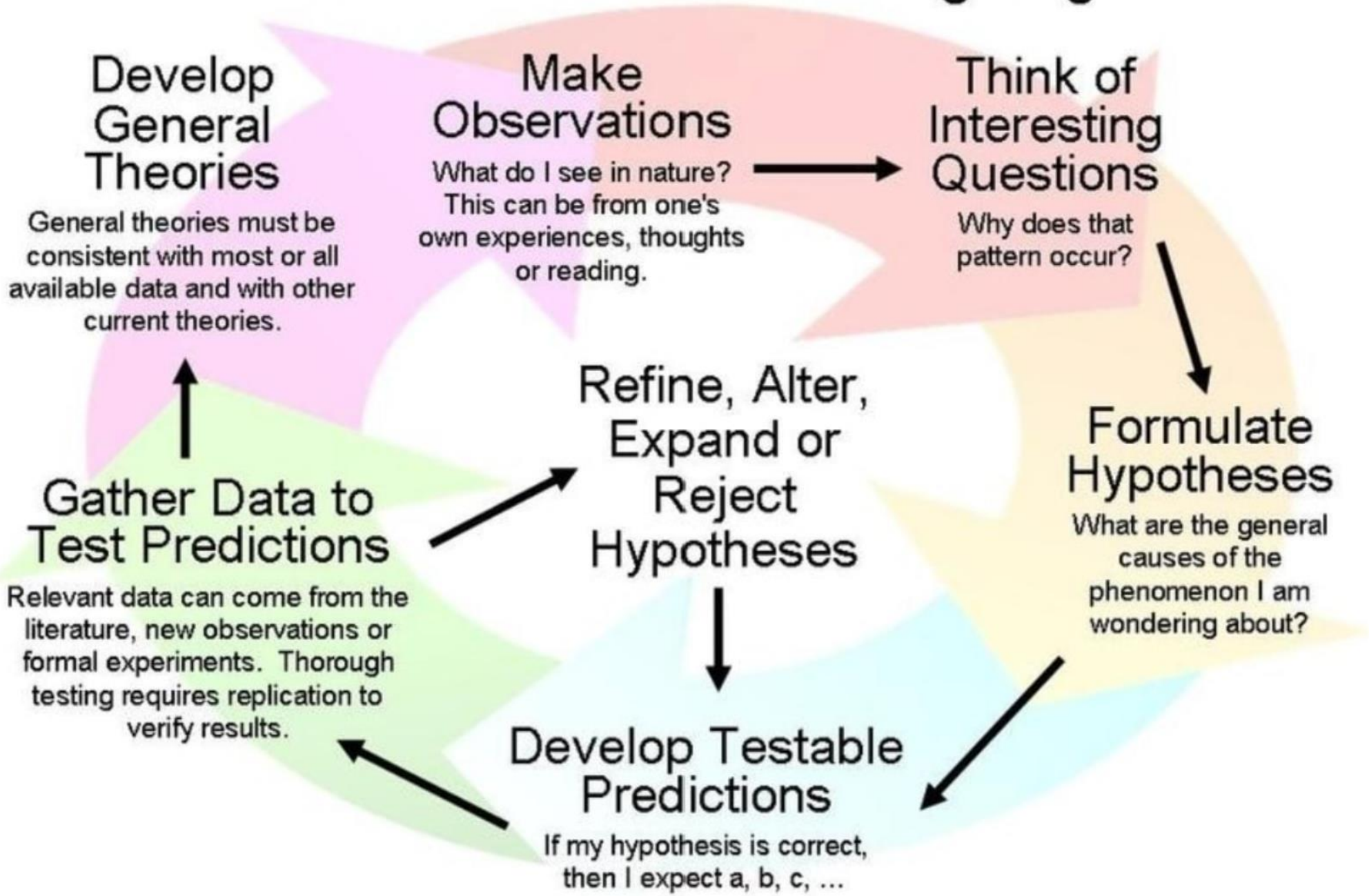
What is science?

- Science, broadly speaking, refers to the **knowledge practices** (generation, organization, transmission) of a given culture
- Knowledge and wisdom have existed in various forms and expressions in *all human cultures*
- Many ancient cultures organized systematic approaches to knowledge
- **Experimentation** and **technology** also existed in the ancient world
- Modern science developed out of existing knowledge practices

What is modern science?

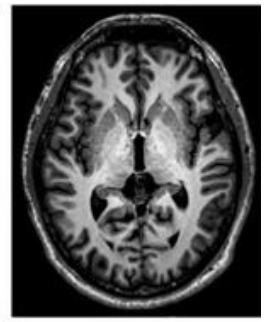
- 16th-17th century European intersection of classical philosophy, new technology, and conflict between the emerging merchant class and the priestly class
  - Science's origins lie in church monasteries and occult mystical traditions like alchemy and hermeticism
- Modern science's innovation is its focus on refining the **process** by which knowledge about the external world is generated
  - This is the scientific method – highly refined knowledge practice
- Scientific development in history is not a straight path. It critically depends on the power structures (church, nation, corporation, institution) that fund it
  - Relationship between science, technological power, and political dominance

The Scientific Method as an Ongoing Process



The pragmatic approach of science

- What is possible?
  - Dependent on the tools available
- Methods are contextual.
  - Use what works
- Approach problems from multiple perspectives.
  - Use multiple tools to point at the thing you are trying to understand
- Everything is probability.
  - Estimate your best guess
- All knowledge is provisional.
  - Theories are tools by which to make sense of the world
- Knowledge is cumulative – it builds on itself.
  - Iteration and refinement of your last best attempt



The pragmatic approach of science

- The beating heart of science is **methodology**
  - Senior scientists focus on the method section of a paper
  - Good **methodology** produces → **data** that can be interpreted → by a **theory**
  - (And good theory informs good methodology)
- How did you manipulate something?
  - Ex. evoking a behavioral response; brain stimulation
- How did you sense something?
  - Ex. MRI, EEG, PET
- How did you calculate something?
  - Ex. Statistical tools
- *How are you certain?*
- Theories are how we organize our knowledge into coherent stories that we can understand and transmit

Reductionism vs. Systems Thinking

Characteristic	Reductionism	Systems Thinking
Principle	Behavior of a biological system can be explained by the properties of its constituent parts	Biological systems possess emergent properties that are only possessed by the system as a whole and not any isolated part
Metaphor	Machine, magic bullet	Network, ecosystem, family
Approach	One factor is singled out for attention and is given explanatory weight on its own	Many factors are simultaneously evaluated to assess the dynamics of the system with different contexts
Critical factors	Predictors/associated factors	Time, space, context
Model characteristics	Linear, predictable, deterministic	Non-linear, sensitive to initial conditions, probabilistic, chaotic
Medical concepts	Health is: normalcy, risk reduction, homeostasis	Health is: robustness, adaptation/plasticity, homeodynamics, antifragility

Systems thinking defines cutting edge science

Holistic Approach: Considers the whole system rather than just individual components, understanding the interrelationships between parts.

Interconnectedness: Emphasizes the importance of relationships and interactions among system components.

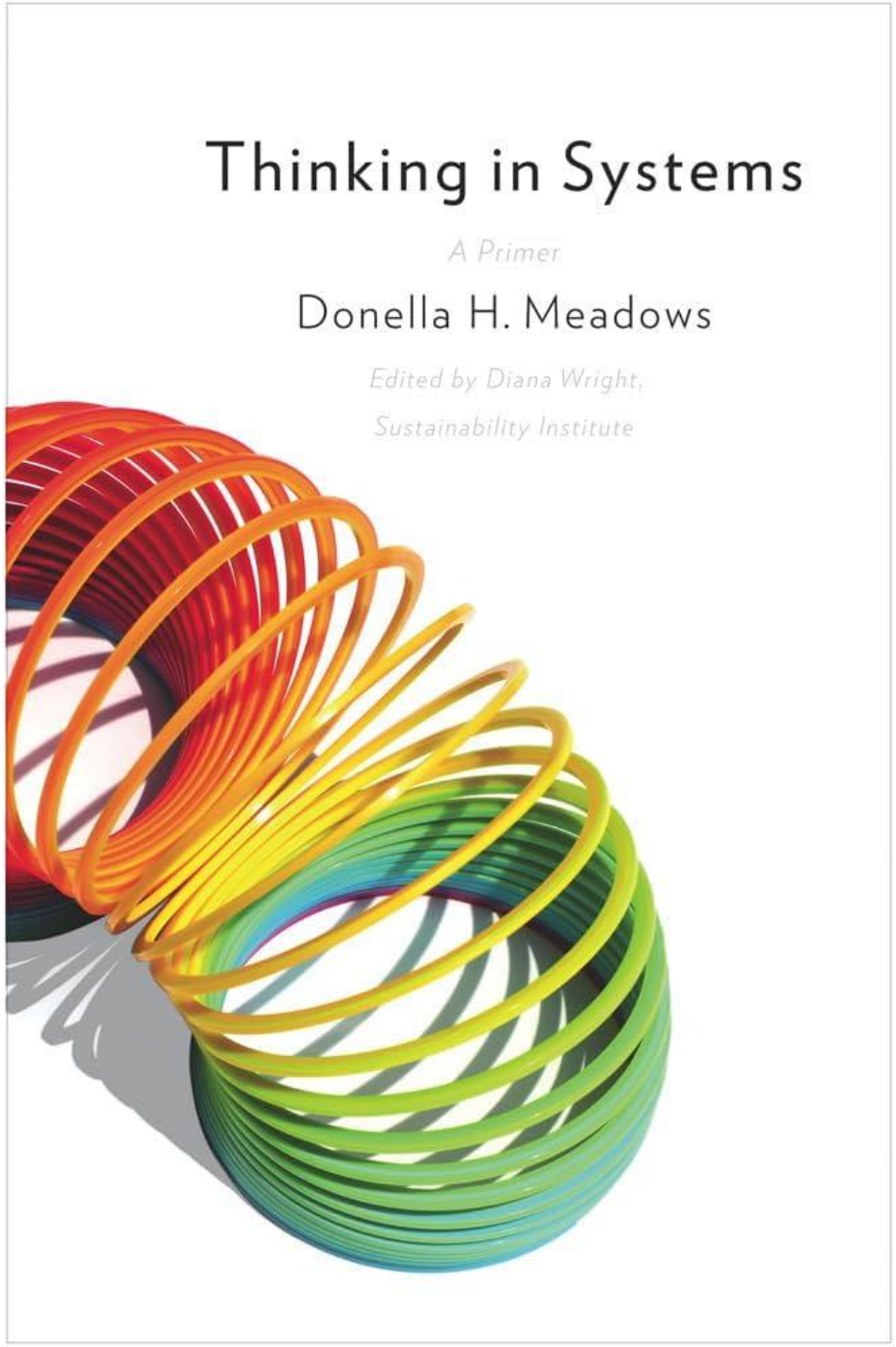
Feedback Loops: Recognizes that systems have feedback mechanisms that can amplify or dampen changes.

Dynamic Complexity: Acknowledges that systems evolve over time and can exhibit complex, non-linear behavior.

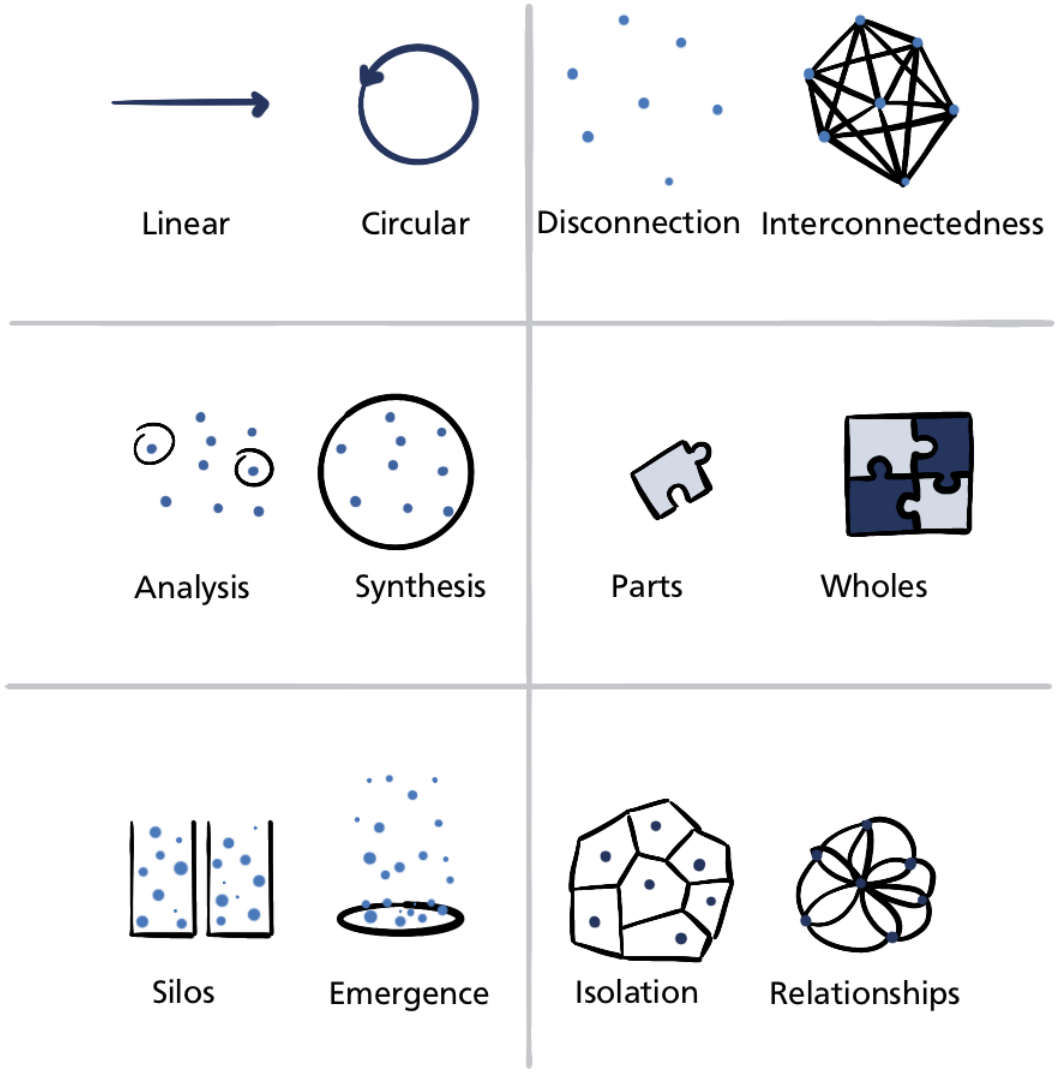
Emergent Properties: Focuses on how the behavior and characteristics of a system arise from the interaction of its parts, not just from the parts themselves.

Multiple Perspectives: Encourages considering various viewpoints to understand the full scope of the system.

Adaptation and Learning: Systems are adaptive, often requiring continuous learning and adjustment to maintain effectiveness.



Thinking in interconnected systems



- Marian Temmen -

Scientism – when science becomes dogma

- Because science is a **process**, it is always **changing**
- The theories that are believed to be true by one era of authorities will be supplanted in a future era
- Social institutions are built, regulations and laws are written, based on belief in the truth of the theories of the time
- This puts pressure on the institution of science to become rigid and inflexible – so that it can justify the legitimacy of the social institutions
- "The science" comes to mean the authoritative weight of a social institution's power, not the practice of science
  - Scientific authority is not infallible, and consensus is not truth
- A society must value its commitment to truth more than its power structures and social institutions for science to survive

The “truth” about science

- Science in its purest form is **not a belief system**
  - It is a process, a way of engaging with the world
- The Big Bang, evolution, “your brain is a computer”, “we are made up of atoms”, “organisms are molecular machines”
  - These are **models** and **theories** to explain empirical evidence
  - They are also **cultural myths** and **metaphors** that reflect the historical and philosophical **contexts** in which they were developed
- Data is not truth or reality. It is just another finger pointing at the Moon
  - Even the collection of raw data relies on foundational models about reality
- Remember, the Truth is beyond us, and we can only ever glimpse impressions of it
  - All our models are approximations and continually evolving
- Science tries to be objective, value-neutral, or agnostic about ultimate truths
  - This allows it great flexibility to discover things about the natural world
- Science does not provide the ultimate truth about existence
  - It critically depends on metaphysical assumptions, like the existence of truth and order

The replication crisis

- The replication crisis: anywhere from 25% - 50% or MORE of research in psychology, social science, and medicine does not replicate
  - The gold standard expert peer review system failed to prevent this
  - Assumptions are made, careers are built, and AIs are trained on research that is faulty
- What to do?
  - If you are not part of the science machine, the best thing you can do is be skeptical
  - Be skeptical of hype, be skeptical of agendas, be skeptical of incredible results, *be especially skeptical when you want it to be true*

The science of the mind

- Bridging the gap between experiential mind and empirical physical reality is incommensurable
  - On the surface, it seems impossible: there is nothing to compare experiential mind with
  - We can only observe our own mind, not anyone else's
- How can biological matter have anything to do with mental activity?
- Here's what we do know from modern science:
  - We can infer things about the mind from looking at brain structure or activity
  - Altering brain structure or activity can alter sensation, action, memory, personality, emotion, mood, pleasure – all the qualities of mind
- Contemplative traditions are a kind of science of the mind
  - They start from the inner nature of experience, rather than the physical world
  - While these practices may hold the literal key to liberation and happiness, they don't have much to say about brains and neurons


THE TRUTH IS OUT THERE