Faculty of Design

2015

History of design's sense of complexity

Bloom, Joshua

A History of Design's Sense of Complexity

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Contentious Fractal Nature of Complexity Dialectics

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Complexity from with (com) ***entwined*** (plectere) ***parts***.

Complexity theory, generally, is the study of the structure (mereology) and behavior of nondeterministic systems composed of elements interacting dynamically, ***over time***.

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Control/Stability Bounds Time/Contingency

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Control/Stability

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(No Model.)

W. S. JOHNSON.

ELECTRIC TELE-THERMOSCOPE.

No. 281,884. Patented July 24, 1883.

Fig. 1.

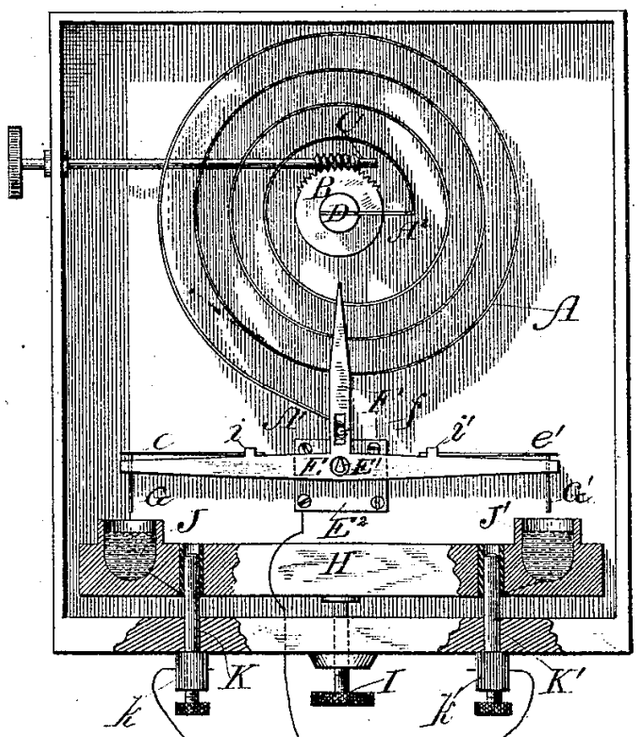


Fig. 2.

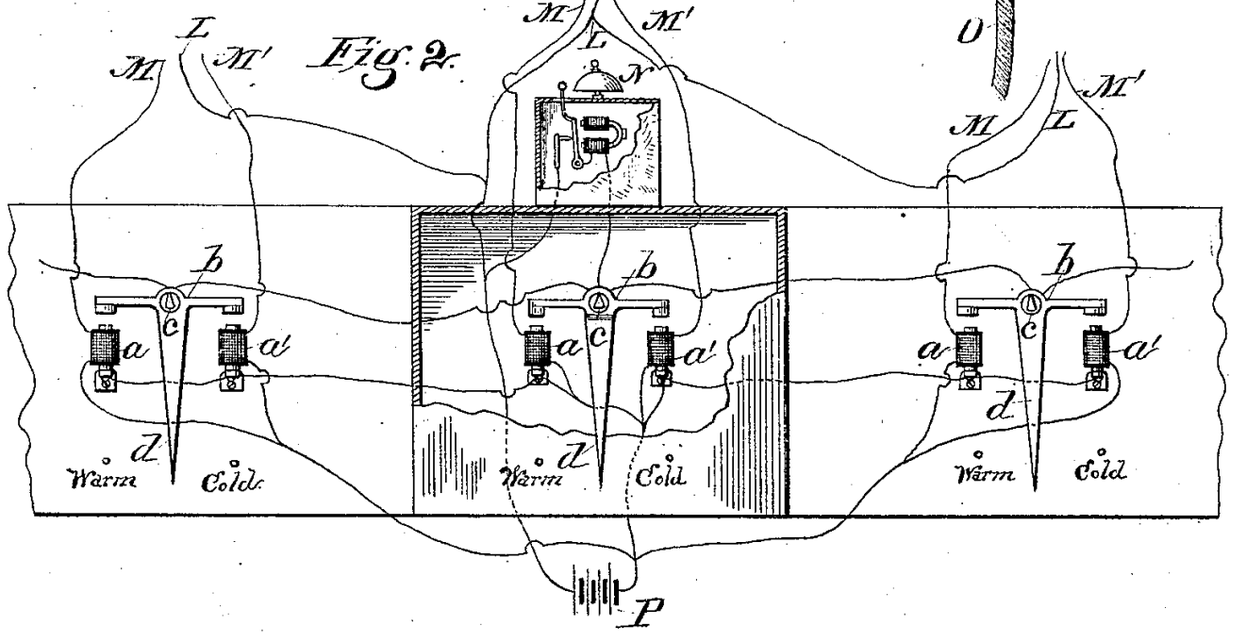
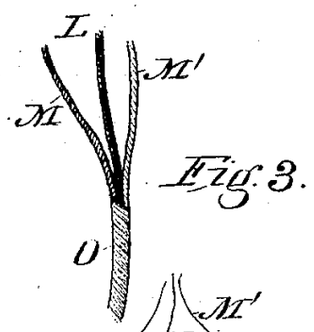
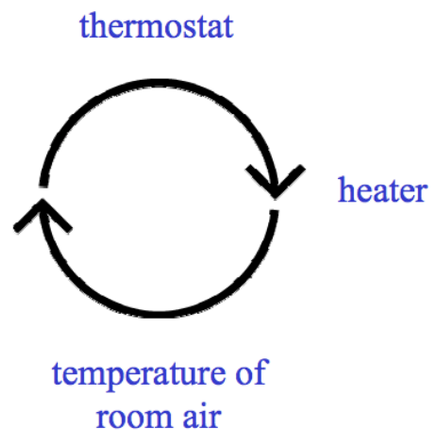


Fig. 3.



A thermostat-heater system serves as a canonical example of a first-order cybernetic system, maintaining temperature at a set-point.

-Dubberly



Given a set of elements, its variety is the number of elements that can be distinguished.
Thus the set {g b c g g c } has a variety of 3 letters.

(If two observers differ in the distinctions they can make, then they will differ in their estimates of the variety. Thus if the set is {b c a aC a B a } its variety in shapes is 5, but its variety in letters is 3. We shall not, however, have to treat this complication).

-Ashby

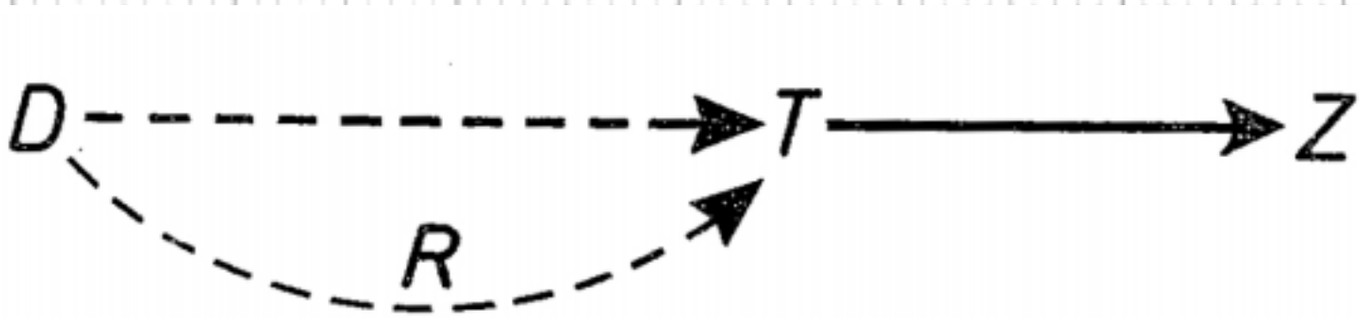


FIG. 1

R's capacity as a regulator cannot exceed its capacity as a channel for variety

-Ashby

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if a fencer faces an opponent who has various modes of attack available, the fencer must be provided with at least an equal number of modes of defence if the outcome is to have the single value: *attack parried*.

-Ashby

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Simplicity as Minimalism

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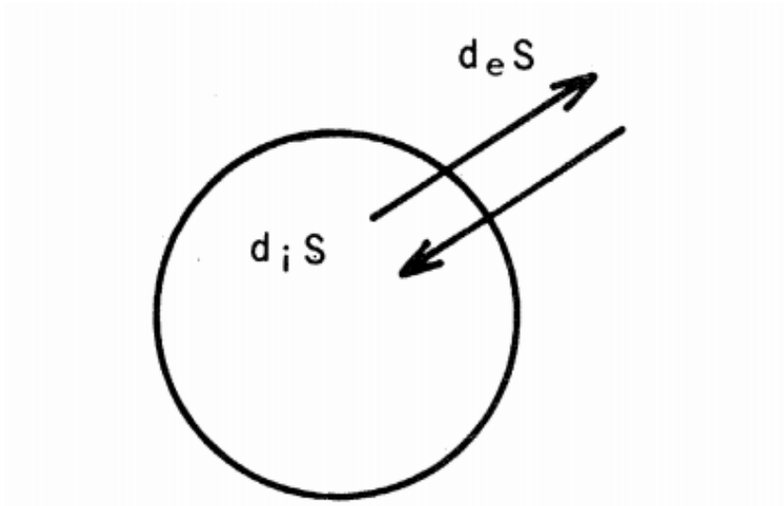

Fig. 1. The exchange of entropy between the outside and the inside.

Nature/ecological, natural, & biological systems

self-organization, autopoiesis, adaptation, and emergence are like Machines

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Near-independence of the several component functions of the system should greatly simplify its fitness landscape, so that, at least in the small, the optimum (or good) values of parameters of one subsystem would be rather insensitive to the values for the other subsystems

-Herbert Simon

Componentization

Optimization vs Dependency

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Complexity is “Out there”

Complexity is really a complexity in the surface of the beach, not a complexity in the ant.

-Herbert Simon

Recovery Resilience

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Complicated vs Complex

Classical science emphasized order and stability; now, in contrast, we see fluctuations, instability, multiple choices, and limited predictability at all levels of observation

-Ilya Prigogine

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Boundaries

Problems

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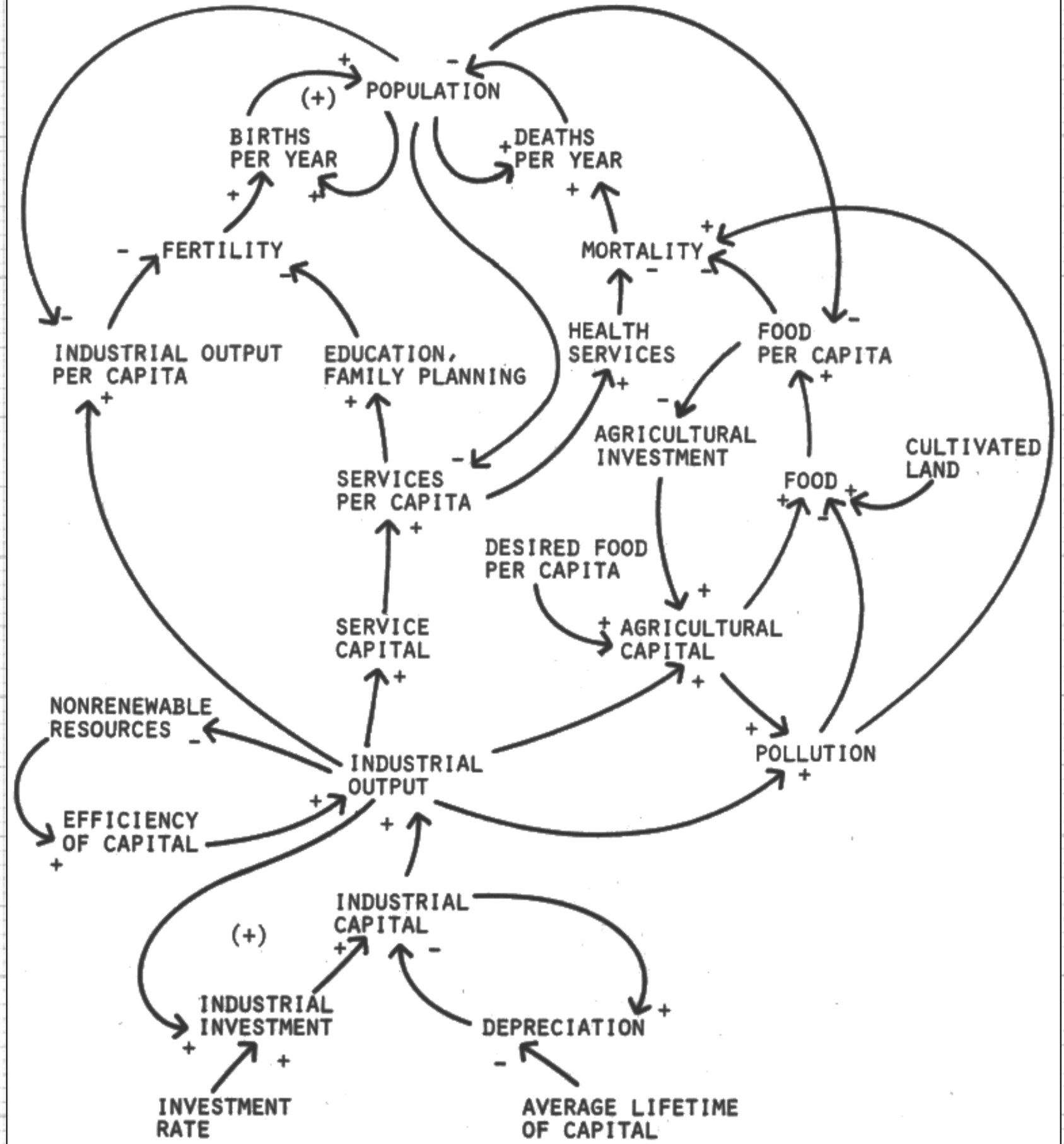

Figure 1-3 Causal-loop diagram of several important feedback loops in World3

PRODUCT

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MEDEMA PRODUCTION FACILITY HERNING DENMARK

MEDEMA OSLO/AKERSHUS HEADQUARTERS SKYTTEN

PRODUCTION

STRATEGY

THE NEW MEDEMA EXPERIENCE

IDEATION

QUALITY

USERS

BUYERS

THERAPISTS

PRIVATE MARKET

INDUSTRY

ISSUES

FUTURE SCENARIOS

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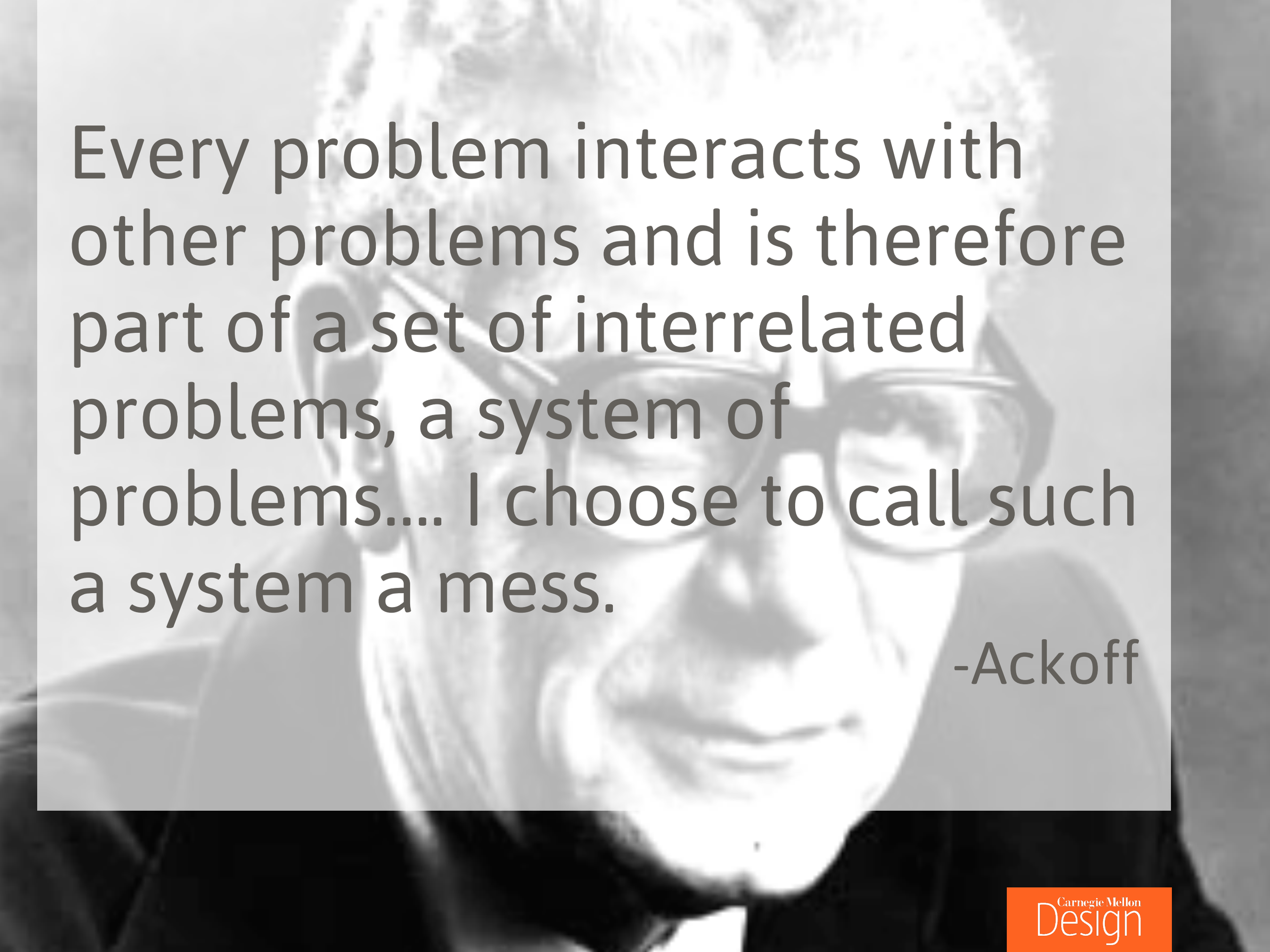

Every problem interacts with other problems and is therefore part of a set of interrelated problems, a system of problems.... I choose to call such a system a mess.

-Ackoff

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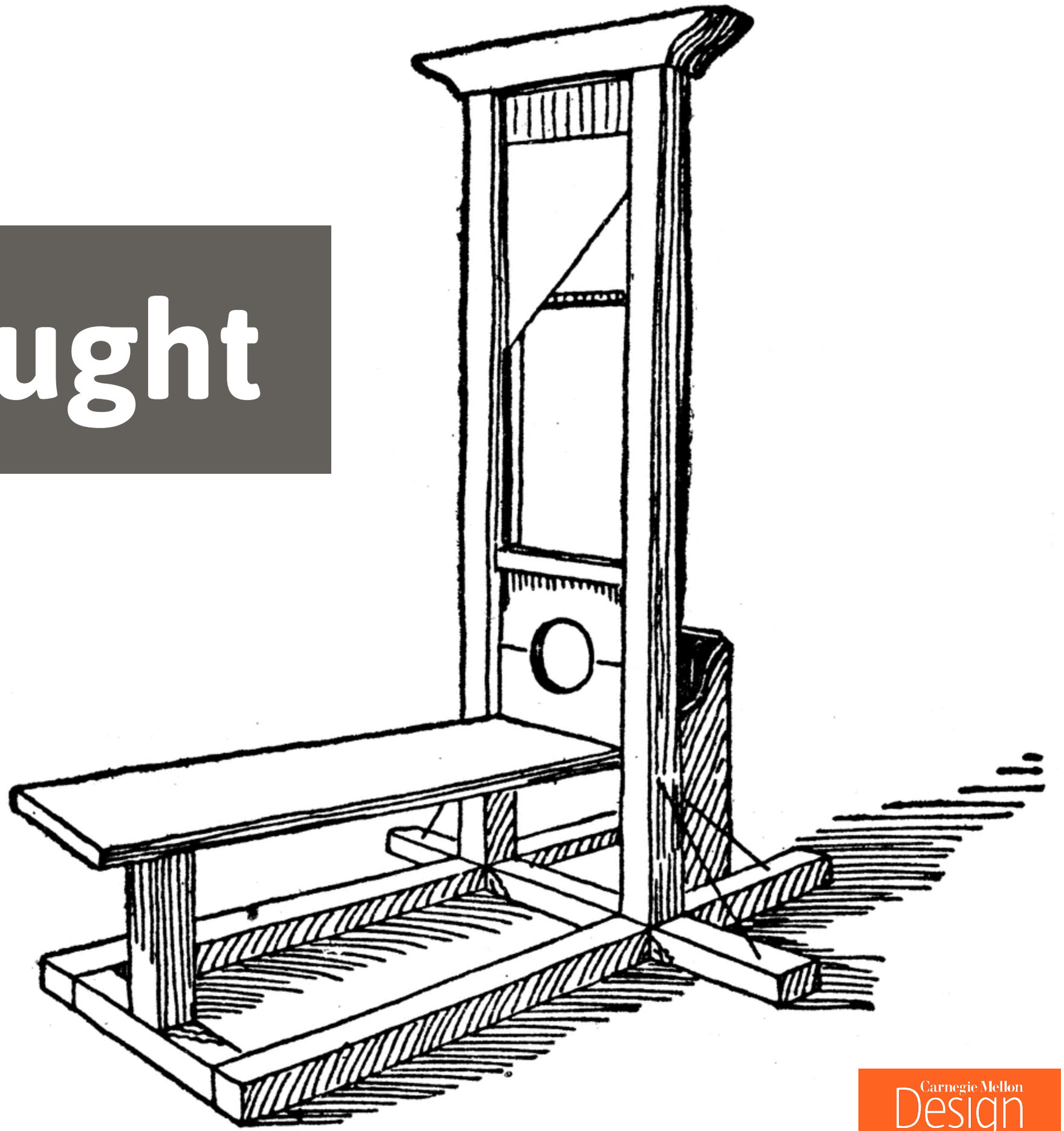
Is/Ought



Bounds

Politics

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Wicked Problems

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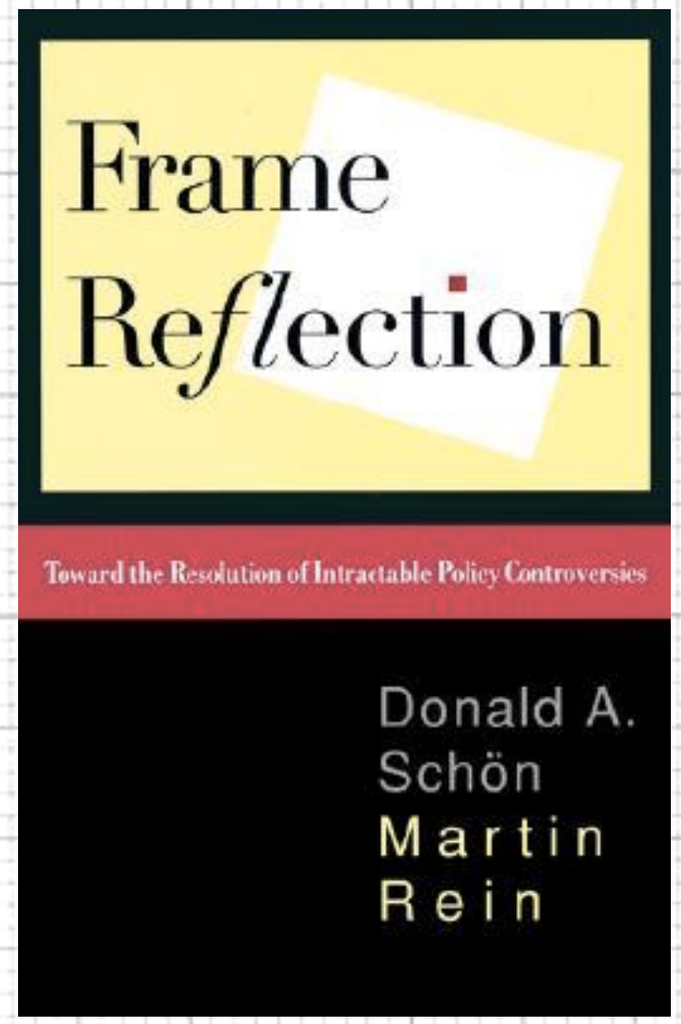
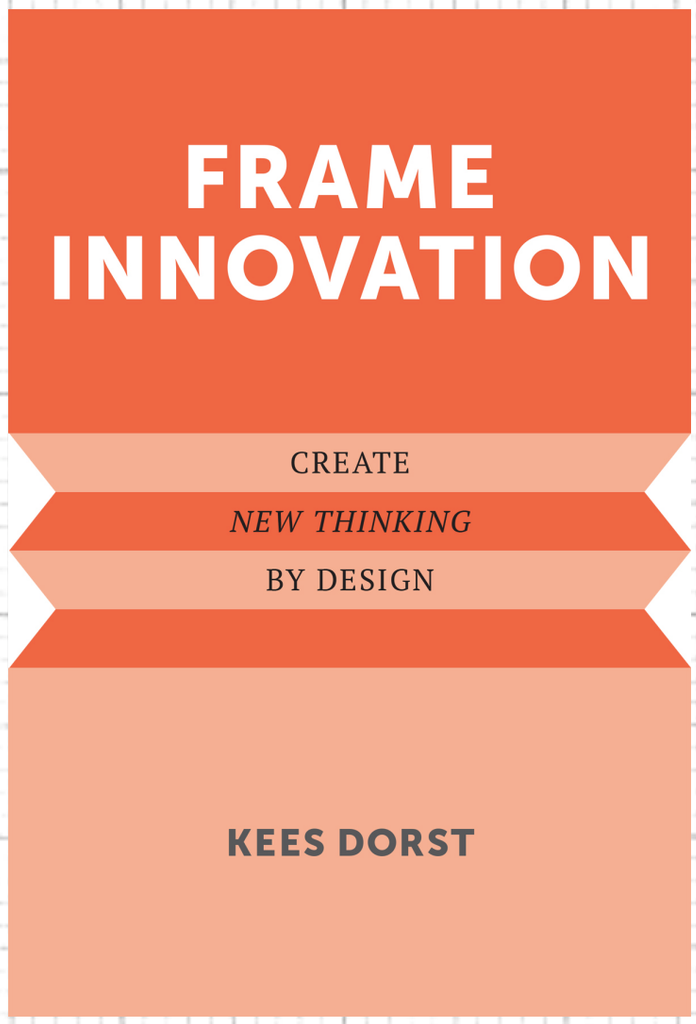
As creatures of bounded rationality, incapable of dealing with the world in all of its complexity, we form a simplified picture of the world, viewing it from our particular organizational vantage point and our organization's interests and goals.

This frame of reference and information provided by an organization influence strongly the processing and outcomes of decisions.

-Herbert A. Simon



Politics
Rhetoric



Action

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Bounded

Politics

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Bounded rationality. The meaning of rationality in situations where the complexity of the environment is immensely greater than the computational powers of the adaptive system.

-Herbert Simon

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Computational Complexity

Bounded Cognition

We're generally overconfident in our opinions and our impressions and judgments.

The planning fallacy is that you make a plan, which is usually a best-case scenario. Then you assume that the outcome will follow your plan, even when you should know better.

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Complexity vs Simplicity

Complexity as a cognitive issue.

Time/Contingency

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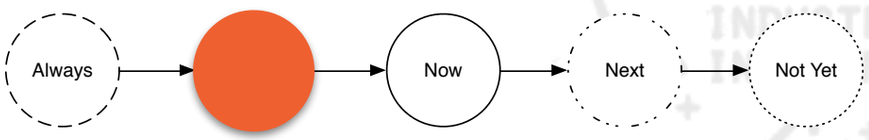
Systems Thinking allows for and often results in atemporal conceptions of systems

Object-Oriented models with attributes are related via timeless relations

Flux is perceived as the modulation of properties of objects



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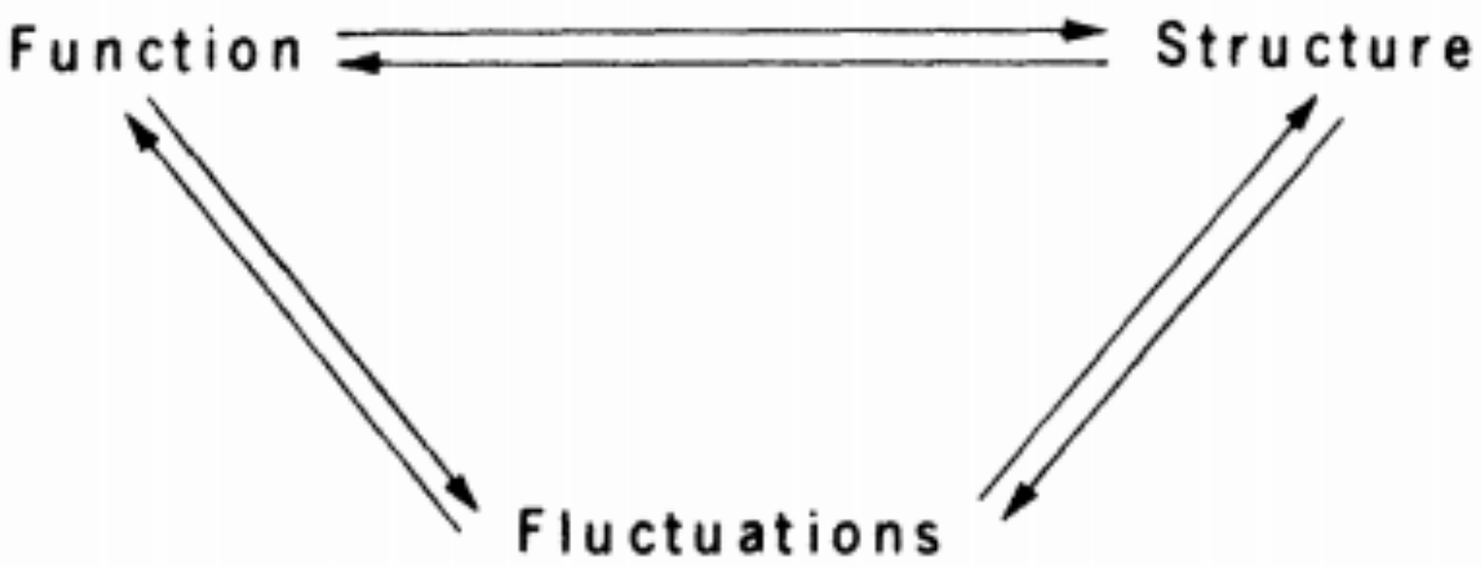
There are three aspects that are always linked in dissipative structures: the function as expressed by the chemical equations; the space-time structure, which results from the instabilities; and the fluctuations, which trigger the instabilities. The interplay between these three aspects leads to most unexpected phenomena, including "order through fluctuations," which I shall analyze below.



Chronos

Kairos

Arrow of Time

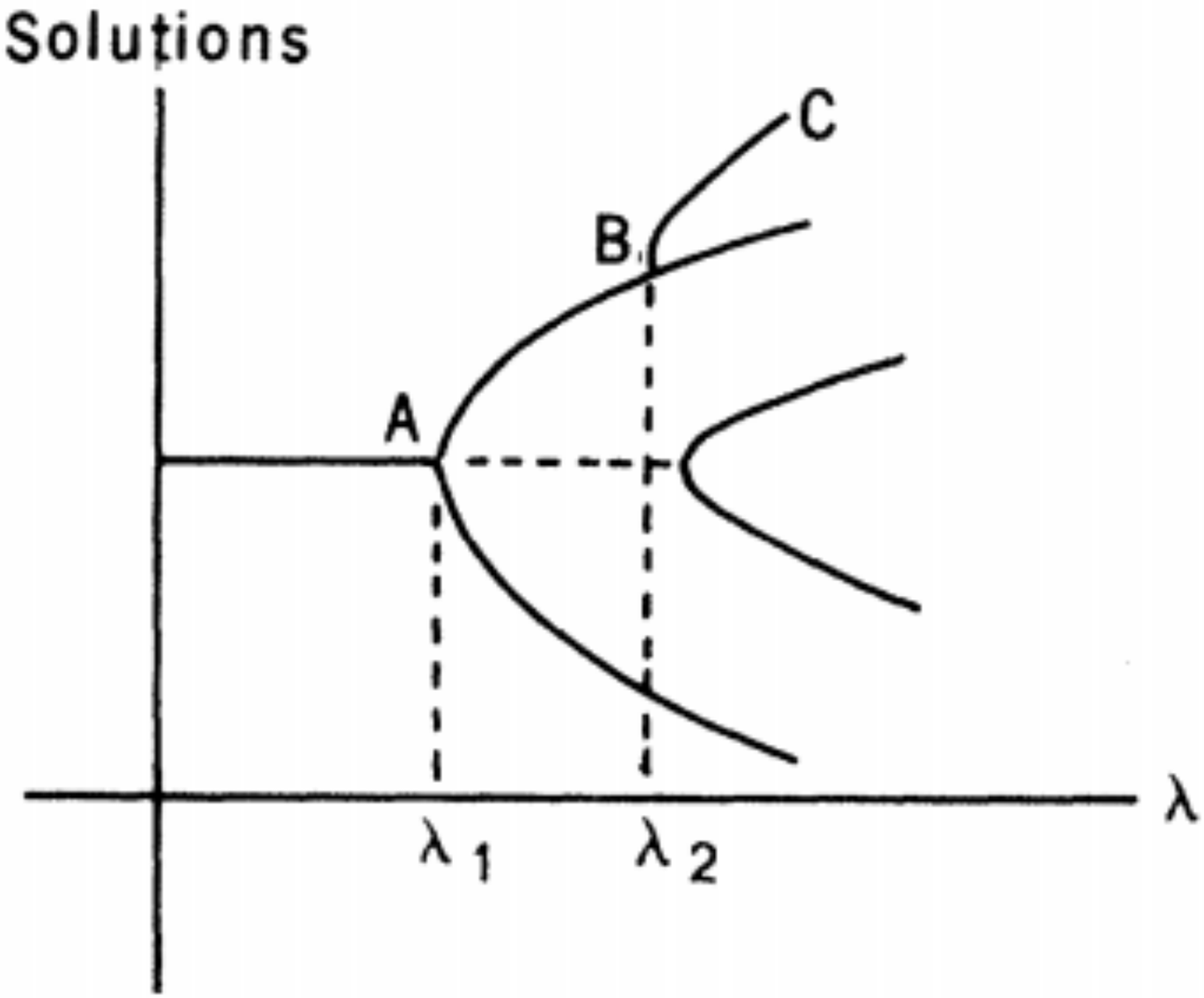
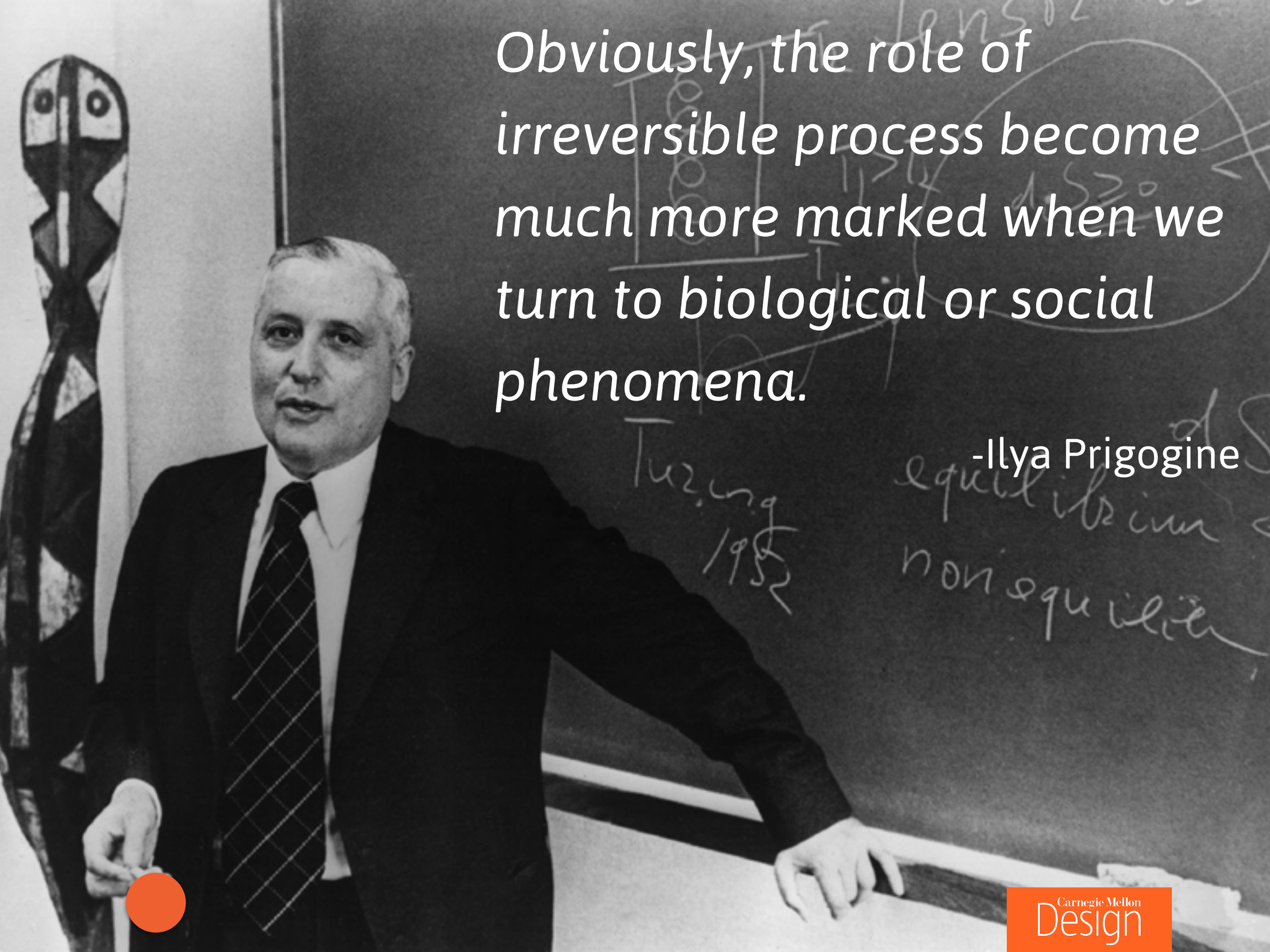


Fig. 4. Successive bifurcations.



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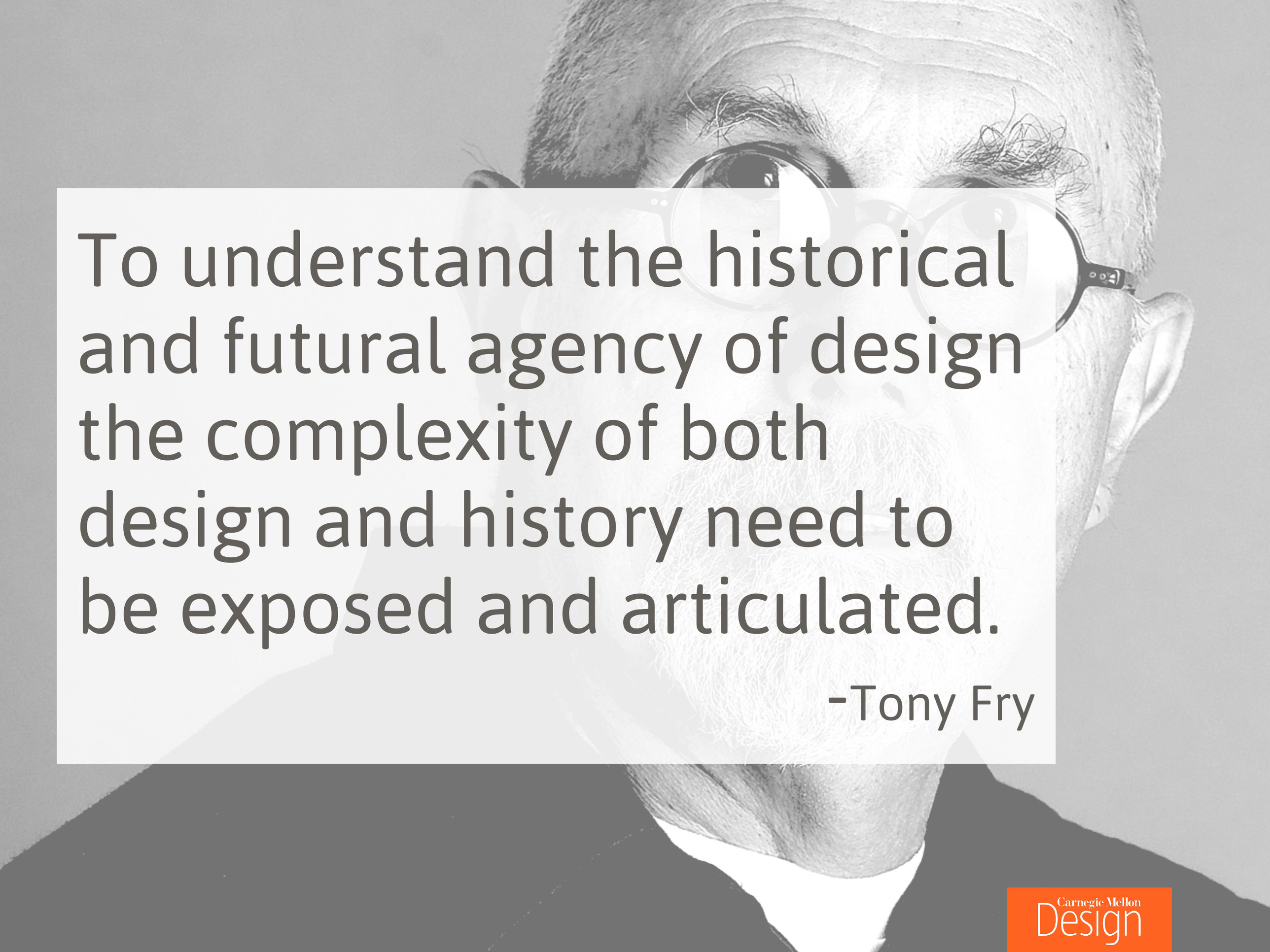

To understand the historical and futural agency of design the complexity of both design and history need to be exposed and articulated.

-Tony Fry

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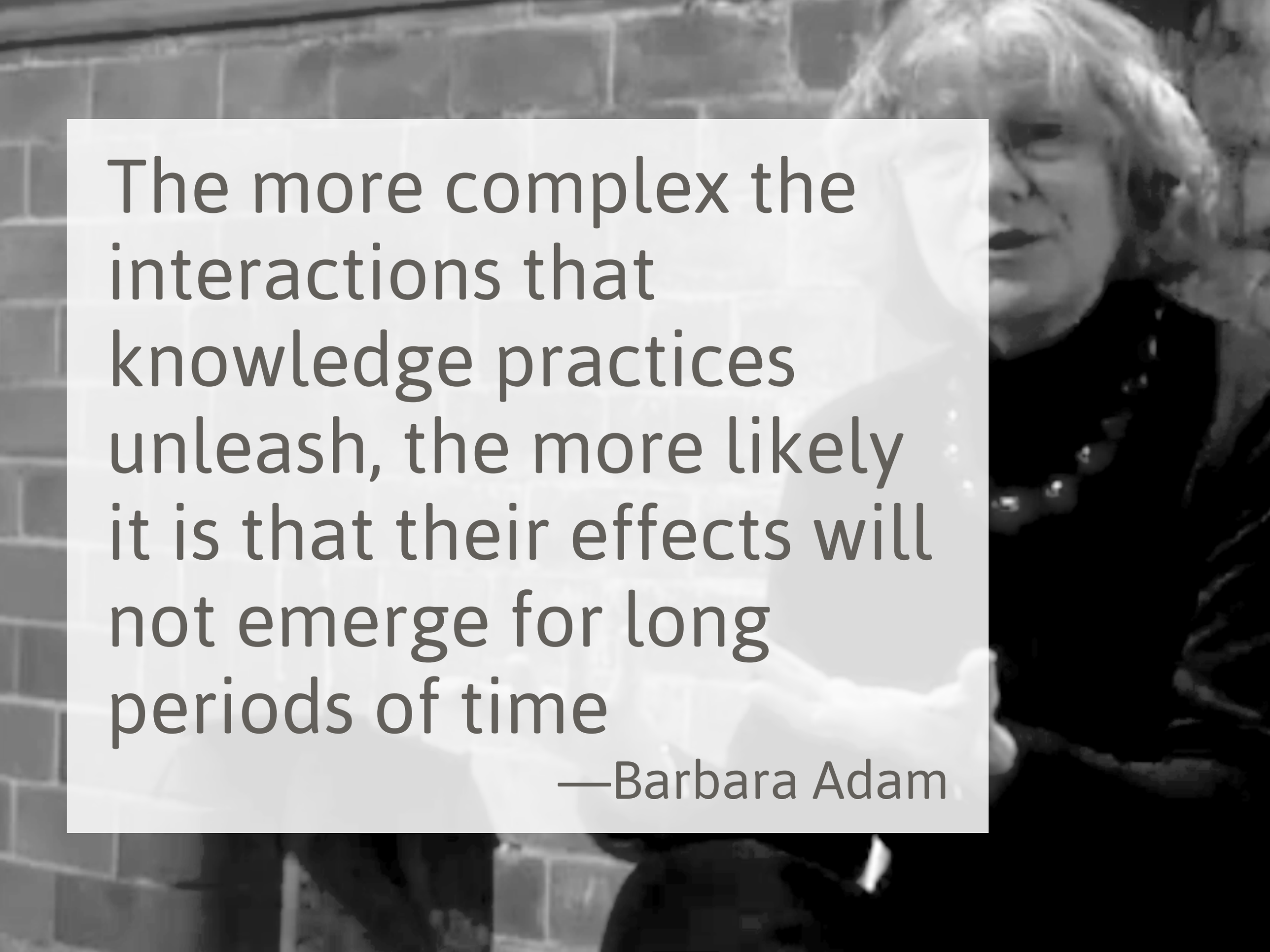

The more complex the interactions that knowledge practices unleash, the more likely it is that their effects will not emerge for long periods of time

—Barbara Adam

(No Model.)

W. S. JOHNSON.

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No. 281,884. Patented July 24, 1883.

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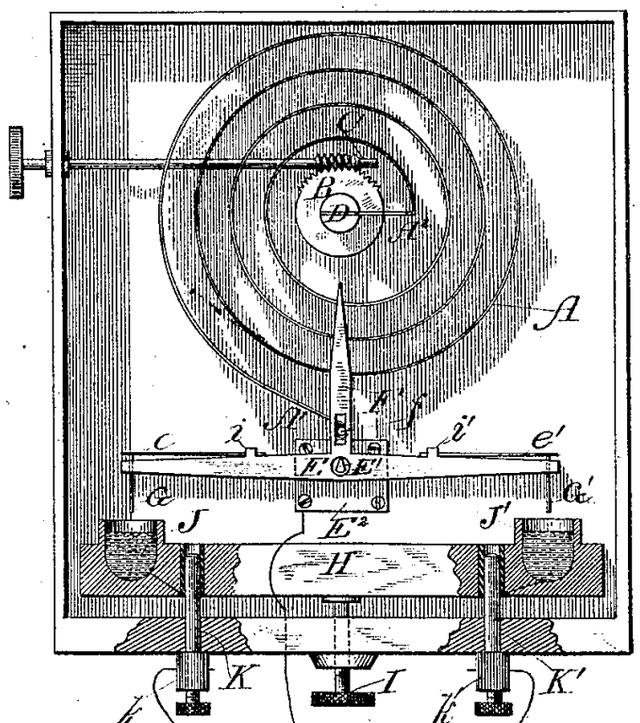

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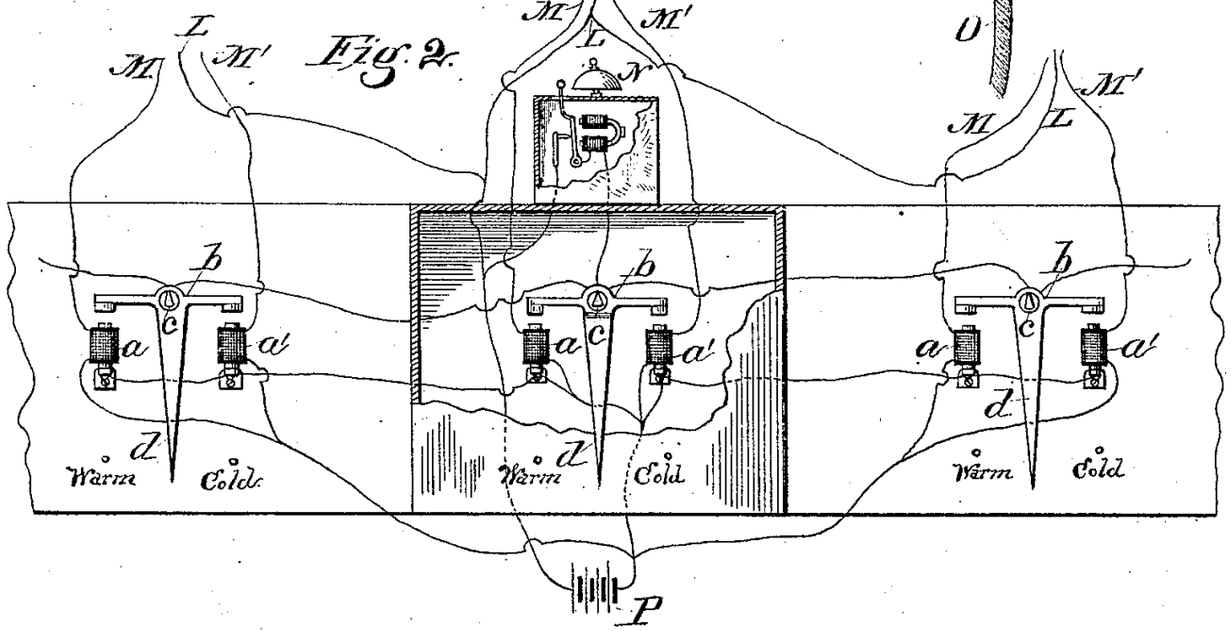

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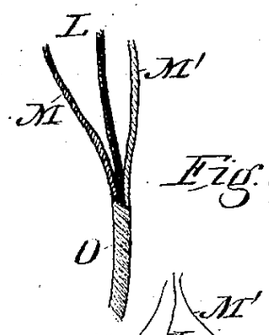
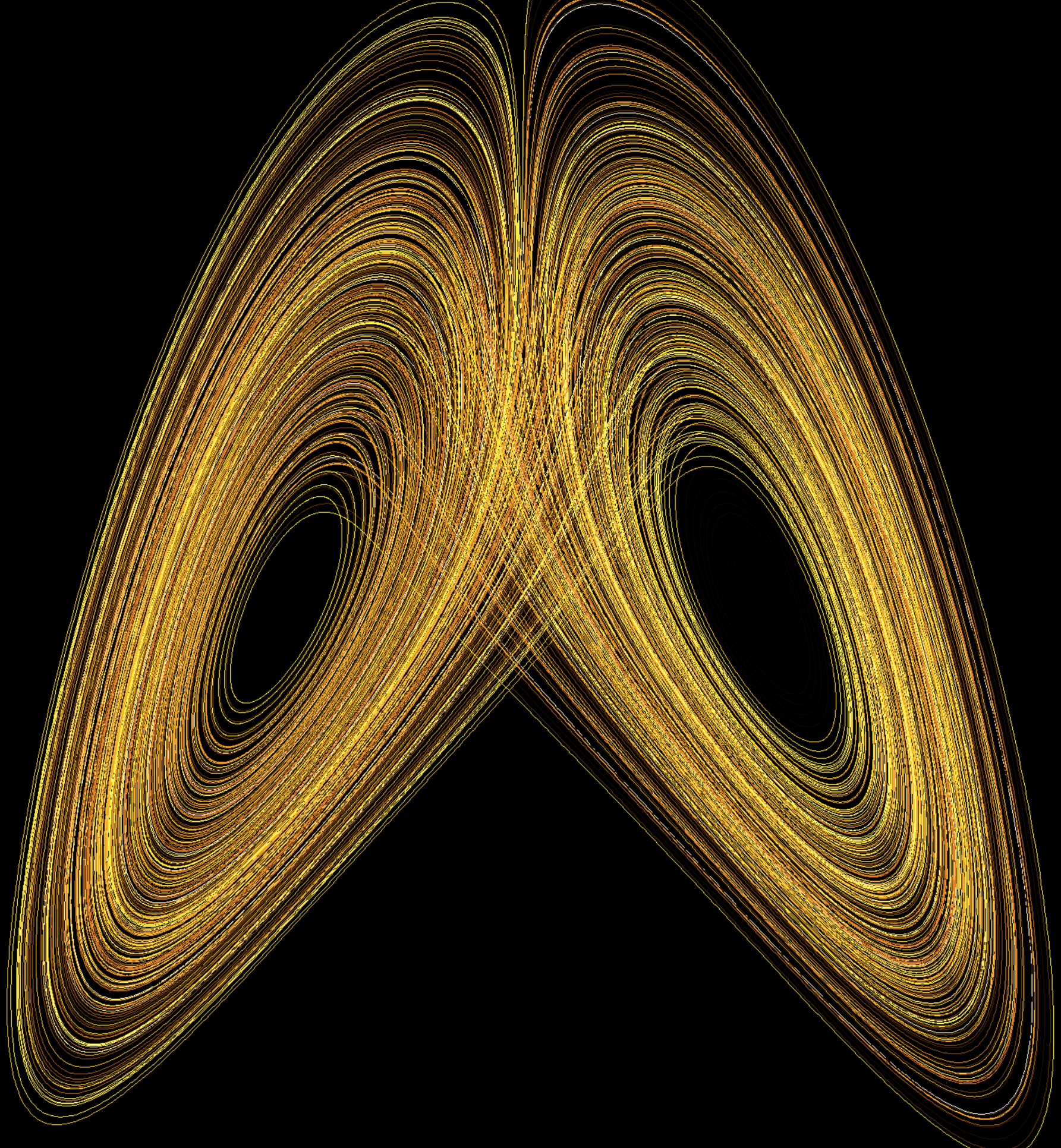


A thermostatic transmitter or system of thermal telegraphy



Complexity & self-organization are common words that anyone with some authority could adopt---but they do not always represent the body of theory that has become `complexity theory'. But the value of scientific concepts lies in their having a specific technical meaning, independent of who uses them, and preferably based on measurement.

-Mark Burgess

http://markburgess.org/blog_complexity.html