**Spun In Space**

Arabella+ won't survive re-entry
out here tying together

onset and end state
at the border of reach

her spinnerets exude
armor and trap and guideline silk

she stumbles it tangles then
—symmetry—filigree—

clinging to her thinner
scaffold swinging on

a weightless hammock
breath steps stops

—a strand of silk a floating bridge—

**Note Arabella**

The two female spiders Arabella and Anita were part of the second *Skylab* crew in 1973. After some adaptation, Arabella did spin webs, and so too, finally, Anita. These were of a finer (less heavy) weave but very similar to their customary earth webs.

**To Think a Wave**

no one frame
no moment no cell no
shot
will do
you need
memory afterimage bodyfeel
jostling &
reeling

verti-
cal
bob-
bing

( Maxwell's+ equations )

and a powerful parallel wind
( white wake on dark water )
blowing the top
molecules free
rush of bubbles tumbling ( billions )
down the wave side
body commotion somersaulting
on a hillside afterimage
Jack
& Jill
water spilling in a pail

( and his intuiting invisibleness-
touching, his, Faraday's+
body-
feel )

**Note Maxwell & Faraday**

Michael Faraday (with ever so little formal education, no mathematics, no money) became a self-taught experimentalist and in 1831 discovered electromagnetic induction (an electric field produced by time-varying magnetic fields), the principle behind the transformer and the generator. He made a huge number of discoveries in electromagnetism and chemistry.

The much younger (ever so well-educated Scottish physicist and upper class mathematician) James Clerk Maxwell regarded Faraday as a mentor. Maxwell's equations describe how electric charge and magnetism interact to produce electromagnetic waves, creating a complete mathematical system for understanding radio, microwave, infrared, visible light, ultraviolet, x-ray, and gamma waves.

Faraday *felt* "lines of force" and believed they were the substance of reality. Maxwell thought otherwise. He thought that force must propagate through an ether, but he said that Faraday's uses of lines of force show him "to have been in reality a mathematician of a very high order–one from whom the mathematicians of the future may derive valuable and fertile methods."

Einstein, whose theories dispensed with ether, kept a picture of Faraday on his wall along with ones of Maxwell and Newton.

**Preferring Chaos to Complexity; or, Civil Disorder: Listen Up!**

Chaotic is *not* opposite Machine-Like,
chaotic *is* machine-like.
Chaotic means watch out for the beginning—a tiniest possible
change, at first, will yield a world of difference
in the end.

Amazing! Still, butterfly wings parting the air
don't cause
anything or not cause anything.
Miniscule differences
witness a world over-sensitive to
*everything*—

When 2 machines work back and forth on each other,
they behave weirdly
—chaotically—
and, as it turns out, perfectly
calculably; whereas
complex systems yield a global cascade of network-wide
uncertain domino effects. Uncertain
is the key thought.

Not that a complex system can't prove robust.
Modestly shocked,
it might just wobble . . . slightly; other
times, that same
shock unstoppably cascades across—the system, vulnerable, fragile.

Often called dynamic networks, complex systems
have a number of parts, "agents," that interact
or adapt to each other
over time and sometimes feature
emergence.

Emergent *is* opposite
machine-like, inherently unpredictable. Look at water,
$H_2O$. We know oxygen and hydrogen atoms, so
presumably, water—
actually, no. Water's 4 ( or 5 ) emergent
traits found in neither O
nor H.

As Stuart Kauffman+ says,
"…it is something of a quiet scandal…
physicists have largely given up
trying to reason
'upward' from the ultimate [low-level] physical laws to larger-scale
events in the universe…."

Chaotic uncertainty is practical, a practical inability to know the beginning.
Complexity: even if we *could* measure a beginning, today,
to an absurd
degree of precision, we still wouldn't
find a law to predict the future.

Which doesn't mean the future is random! There are patterns.
Patterns
( all ultimately ephemeral and context always
matters ) are not random. Random means no pattern. Complexity
has patterns like water, emergent patterns,
often repeating, however
unreliable.

Side note: the "edge of chaos" ( confusingly ) belongs tocomplexity,
a spectrum—one end "machine-like,"
the other "random."
At the "edge of
chaos,"
there are patterns in the system. So it *isn't* random;
also, enough fluidity and emergent
creativity
that it's not robotic, either; i.e., you should
pay attention to poems,
to evidence of civil *order*—

To conclude,
it is tempting to believe that chaos
is a highly complex type of complexity,
but it isn't. It's machine-like.
To understand non-machine-like systems, complex systems, social
systems like soil, city, civil order, the sea,
we wish you poems,
complex, uncertain knowledge
*&* luck

With thanks/apologies to Greg Fisher's Synthesis blog

**Note Kauffman**

Stuart Kauffman argues that the complexity of biological systems and organisms results as much from self-organization and far-from-equilibrium dynamics as from Darwinian natural selection. He is the primary inventor of the NK mathematical model, described as a tunable rugged fitness landscape. "Tunable ruggedness" captures the intuition that both the overall size of the landscape and the number of its local "hills and valleys" can be adjusted via changes to its two parameters: N, the length of a string of evolution, and K, its endpoint. The NK model has found application in the study of evolutionary biology, immunology, optimization, technological evolution, and complex systems.

**Over the River & Through the Woods: Asylum**

Flying squirrels attacked by salamanders leaping
on their backs wreathe the porcelain shell of this jack o' lantern
jar; its glaze, up close, grained with cracks
like the veins breaking in her legs—

lift the lid, peer down. A bulb, not a candle.
Lamplight, quiet on the table, falls from openings between
their braiding bodies.

•

Near the floor, poking out from the bricks, a stem of copper pipe.
A daisy-handle tip. *Don't Touch!*
Look. Her small stove, a cube of honeycombed holes, sits
dull and buff until . . . she twists the handle.

Gasp! A swallowed sound. Gas flows to the hive. Hexagonal
cups surge with bees banded three shades of blue. Not red roaring
fire, burr flames buzzing in each cell.

•

Sun, setting through the front door fanlight, shatters
on the hall mirror toying with the beveled edge. Each nick an explosion.
Darts of green climb reflected up the radiator's silver paint,
the valve's hissing steam, a visible waver everywhere in the air

—touching the woman who hangs in the dark with a speckled fawn,
her curling fingernails *foot*-long, blades not combs
in her hair, staring at my back.

•

*Break your light, child, break it up.* It is my safe place. Safe. Away
from home. Satin on the blanket frayed by my lips.