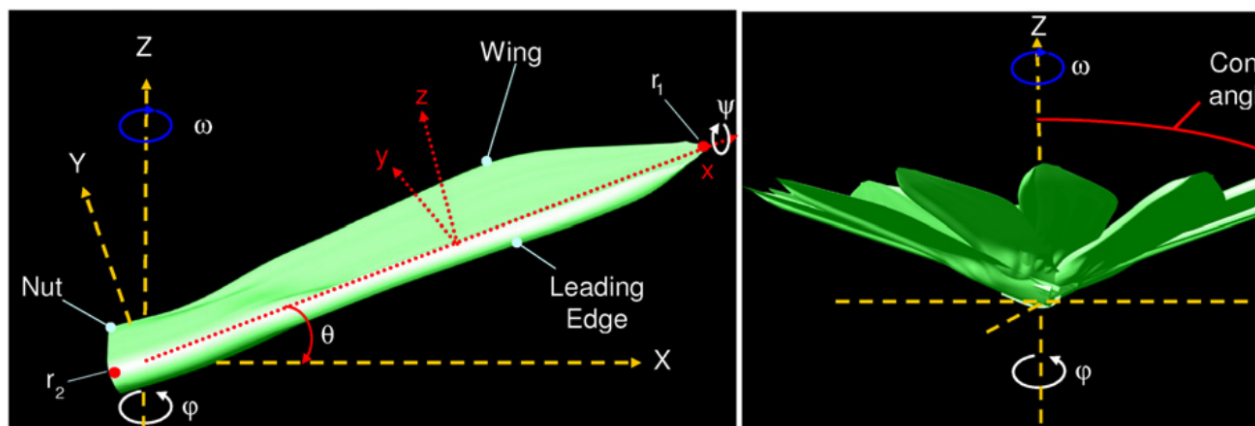


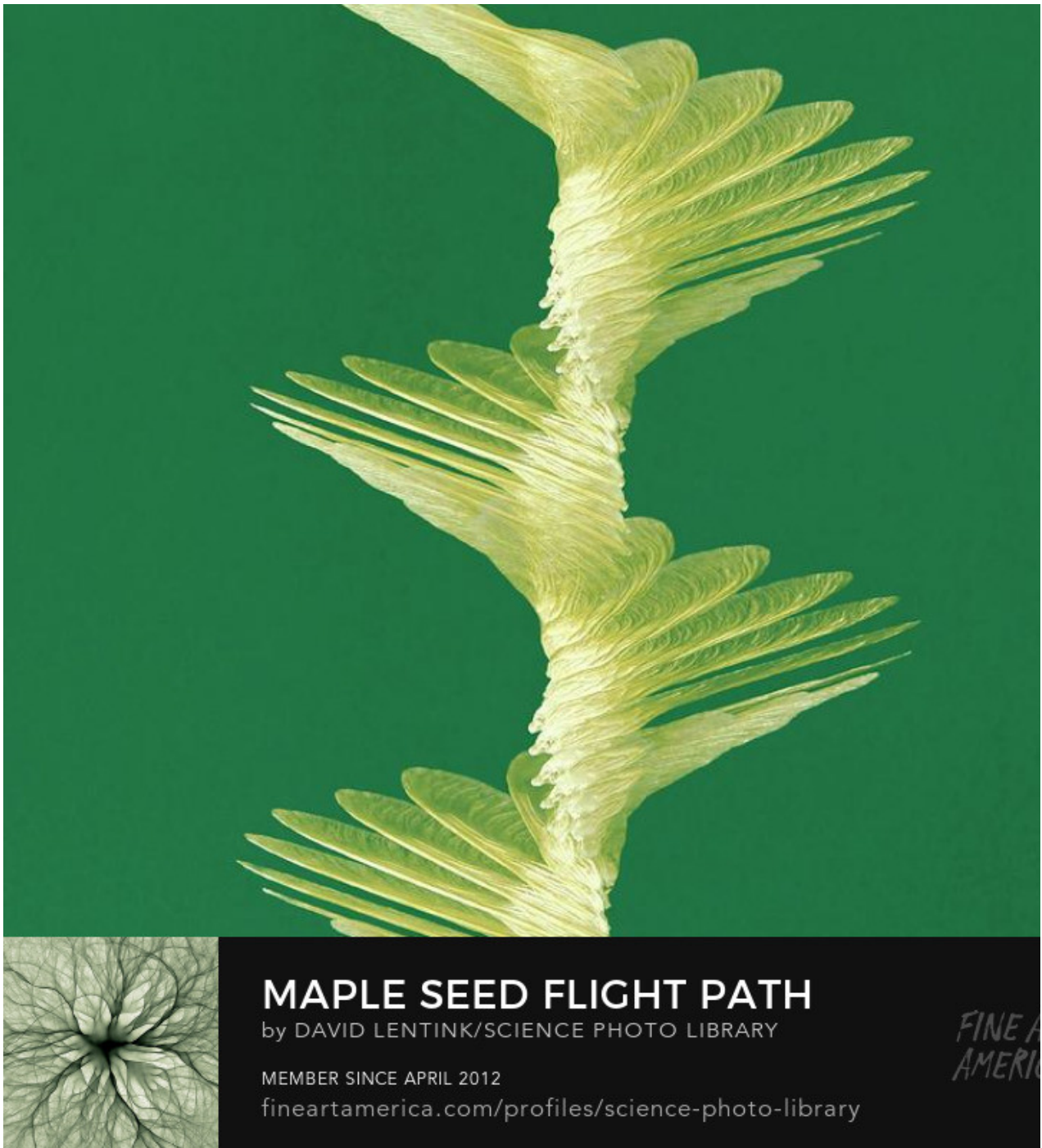
The Fruit of Samara



A maple seed falls in a characteristic helical motion; the shape of a helix; spiral.

Introduction

When I (Trent) was younger, I always loved playing with samara seeds. I would collect them up – careful not to damage them, and drop them from the highest place I could find. Noticing as they topple for just a moment then, with an almost eerie certainty, "floop!" right into rhythm coptering gently on down... landing softly on the grass as I swiftly released the breath I'd been grasping onto. Phew! Relief. Softness. Stillness. Safety. Certainty.



Observation

It appears the "***initial transition from rest to a steady gyration***" occurs in three steps:

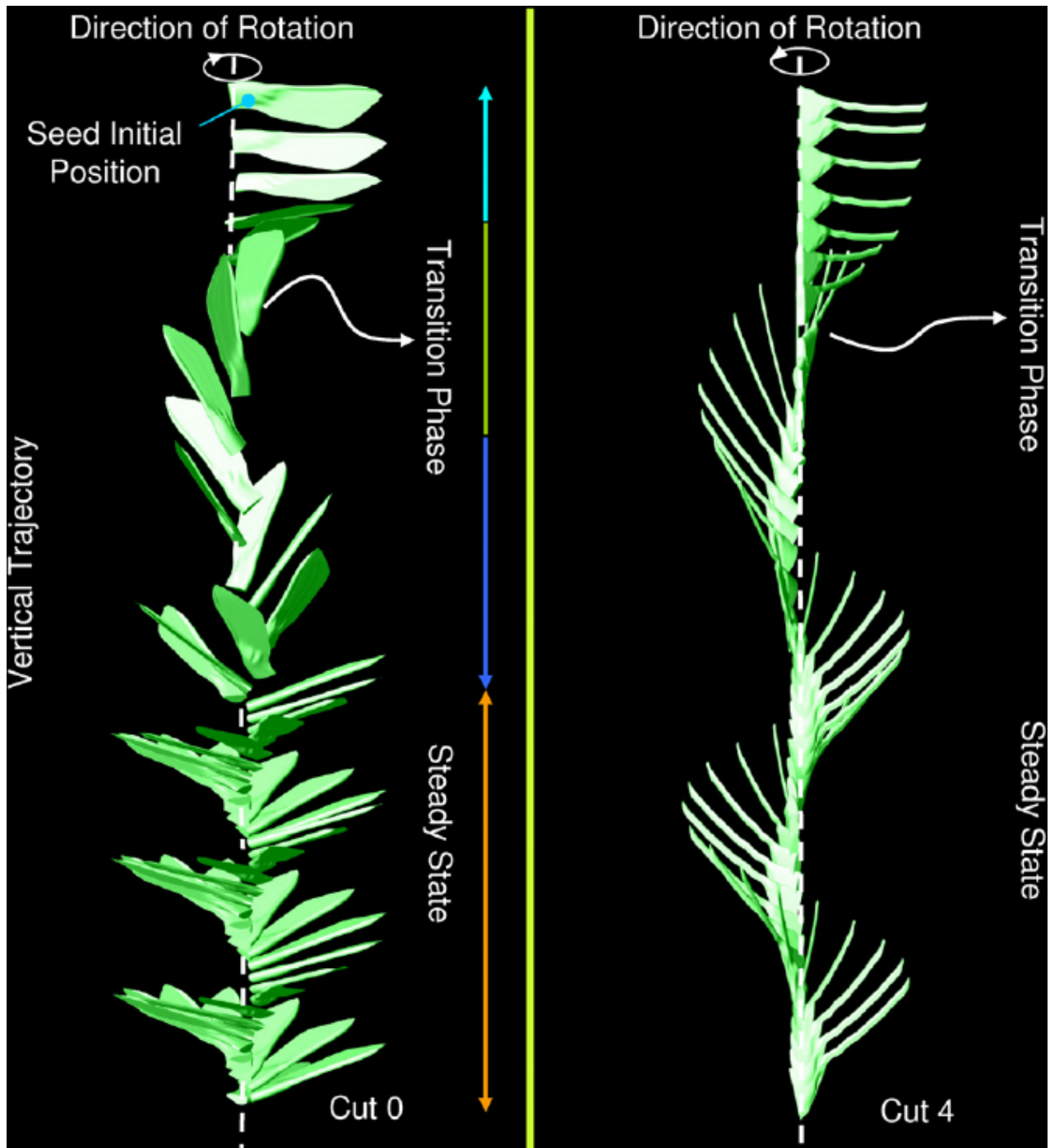
#First a tumble about the span-wise direction, followed by a tilt towards the vertical axis,

#Second leading to the gyration about the vertical axis and an opening of the cone angle

before **#Third** finally **settling into a steady state descent towards Planet Earth.**

There is Peace within that Patience.

There is Joy & Excitement, anticipating each samara's transition to its own personal fall, it's own transitional drama into the ground.



The Drama, that's It.

The Drama is that story being played out in "real-time", suspended within those critical moments of transition... trusting that yes even the most damaged/misshapen/puny/enormous/ugly seed's leading edge, does indeed, have the Life Source encoding necessary for what Life intends.

Inquiry

Q: How does Samara settle into its steady-state spiral descent toward Germination?

A **crude analogy** of a wind turbine suggests that the **torque due to aerodynamic force** would **initiate the gyration** of the seed.

"A surprise came when we cut off much of the wing of a maple seed and found that the seed still gyrated about the vertical axis. This immediately suggests that the cause of the gyration has little to do with the steady-state aerodynamic torque."

"In fact, a seed with only a sliver of leading edge can still gyrate." (However, if the **aerodynamic force is completely absent**, a seed **would fall from rest like a rock** in a vacuum.)

Conclusion

The 3 essential ingredients that lead to helical motion.

#First is the **"asymmetric mass distribution"** of the seed, with the **centre of mass "far away from the centroid"** of the seed.

#Second is the **"aerodynamic damping that initiates a tilt"** of the seed which **eventually "evolves into a helical motion due to the rigid-body dynamics."**

#Third is the **"aerodynamic force in the steady state"** that **"balances the weight of the seed and the centrifugal force."** It appears it is **"the *subtle coupling* between *the initial aerodynamic torque & the rigid-body dynamics*"** that distinguishes this case from all the other autorotational mechanisms.

It appears it is **"the *subtle coupling* between the *initial aerodynamic torque & the rigid-body dynamics*"**

that distinguishes this case from all the other auto-rotational mechanisms.

We now listen as Samara discovers her steady-state descent towards Planet Earth...

Study source: https://dragonfly.tam.cornell.edu/publications/2012_nonlinearity_kapil.pdf

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