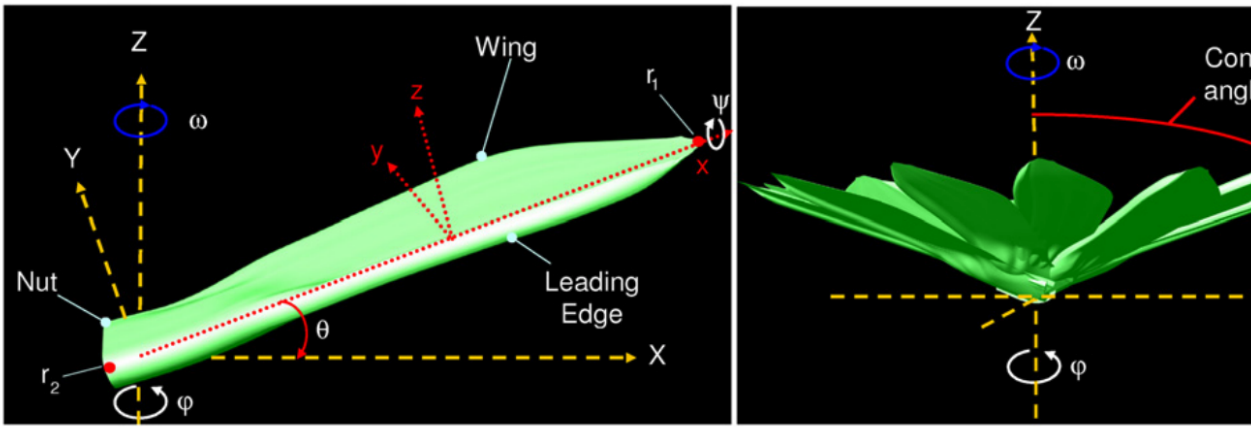
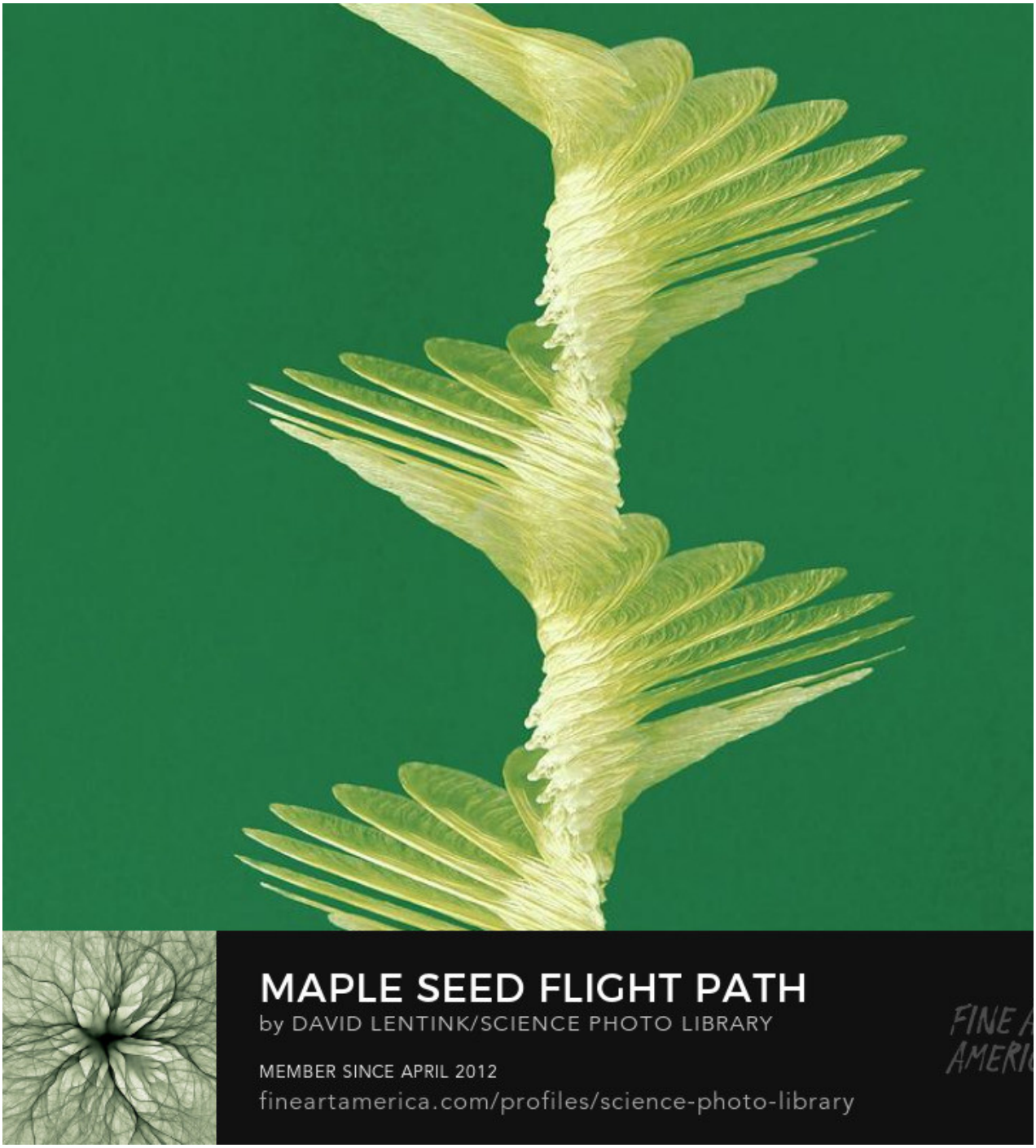
The Fruit of Samara



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 copter-ing 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.

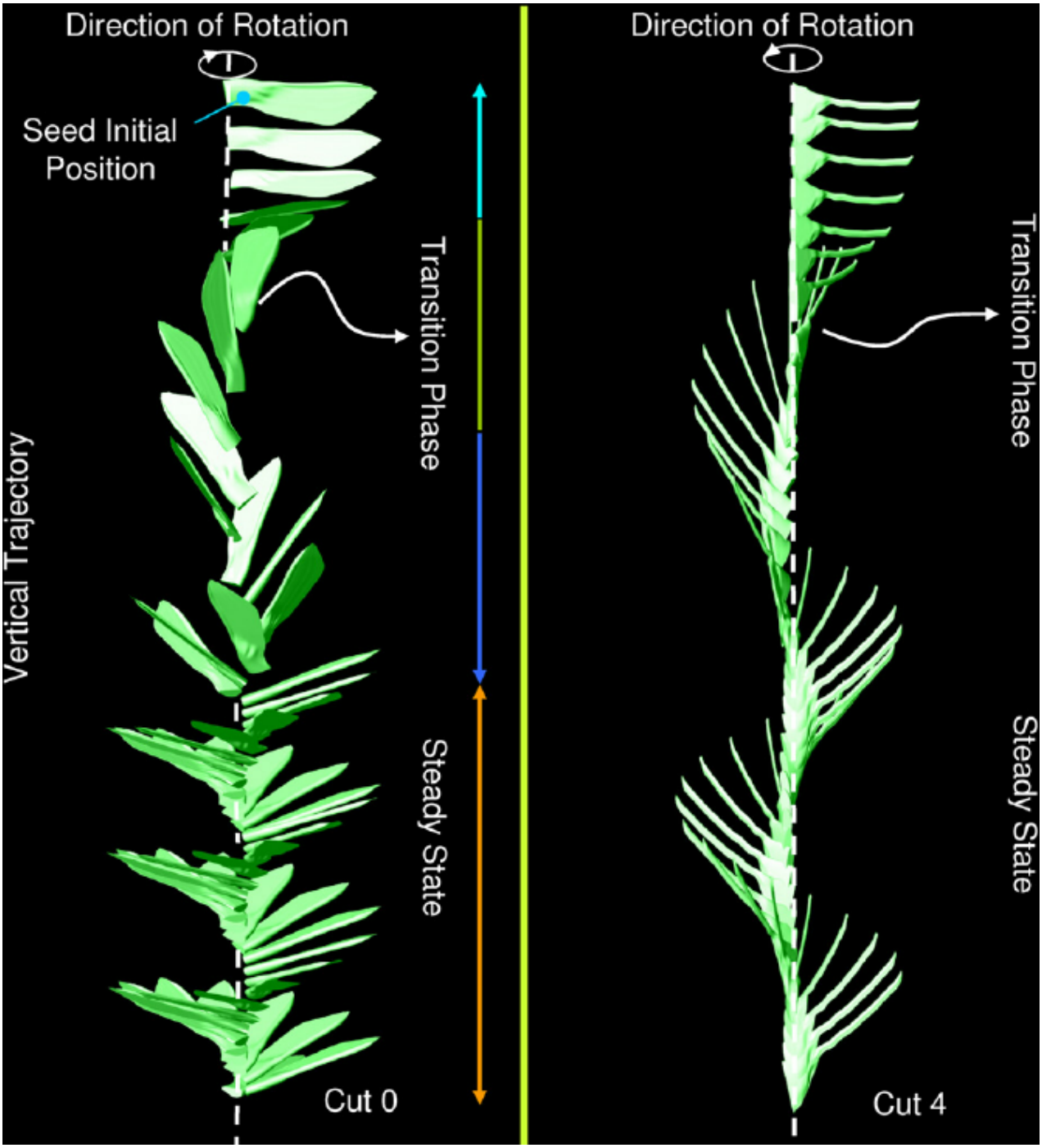


Observation

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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Revision #39
Created 2021-04-13 11:10:22 UTC by bongani
Updated 2021-04-20 16:03:10 UTC by trentbrown