

**Tesla's "Egg of Columbus"
Demonstration
Using the " Φ TOP[®]"**

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Introducing the Φ TOP[®] (PhiTOP)

By examining the rise of the center of mass of a wide variety of rotating objects, I found that prolate ellipsoids with a ratio of major to minor axes c/a in the range $\sim 1.5 - 1.7$ displayed some of the most interesting dynamical effects. The “ Φ TOP[®]” (U. S. Patent # 9,561,446) has $c/a =$ the “golden mean” $= \Phi = (1 + 5^{1/2})/2 \sim 1.618\dots$:



<http://www.thephitop.com>

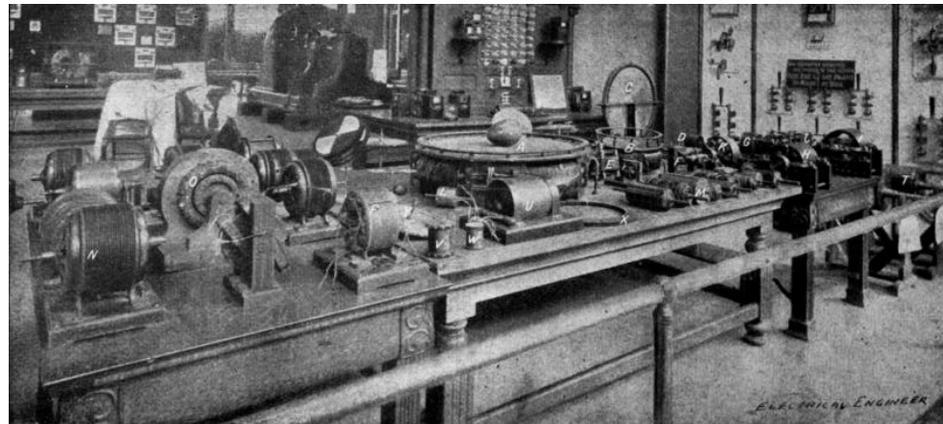
The Φ TOP[®] in Action



Spun rapidly by hand starting from a horizontal orientation, the Φ TOP[®] quickly stands erect, and can continue to spin in a vertical orientation for 2 - 3 minutes. The Φ TOP[®] has been created out of aluminum, brass, copper (as well as many other metals, plastics and glass).

Tesla's "Egg of Columbus"

The Serbian scientist Nikola Tesla devised this demonstration in the 1880's. It combines mechanics and electrodynamics to show one of the advantages of AC over DC electricity. It helped convince investors such as J. P. Morgan, George Westinghouse and others to back Tesla's AC technological systems over the DC technology favored by Thomas Alva Edison. The demonstration also dazzled the public at the Columbian Exposition held in Chicago in 1893. The triumph of AC over DC is probably one of the most important events in the history of technology.



The “Egg of Columbus” Tale

The story dates from the mid 16th century, possibly earlier.



“Columbus Breaking the Egg”, print by William Hogarth, 1751.

Tesla's "Egg of Columbus" Demonstration



Reproduction of the original apparatus (Tesla Museum in Belgrade)

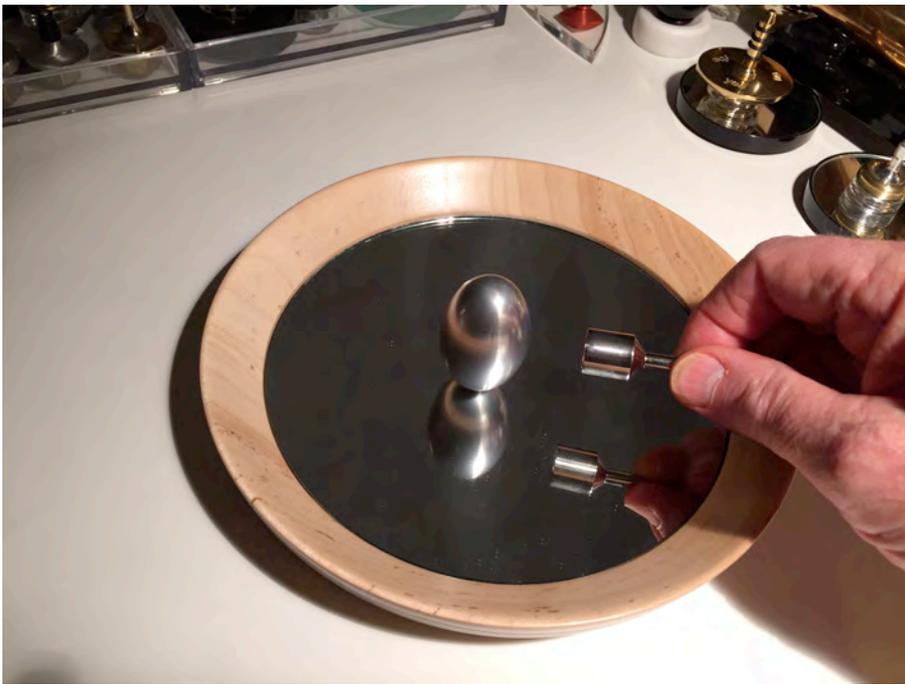
Magnetic Stirrer with a Φ TOP[®]

By placing the Φ TOP[®] onto a mirrored surface on top of a standard laboratory magnetic stirrer, one can effectively reproduce Tesla's original demonstration. Permanent magnets rotated by the motor in a magnetic stirrer give rise to a rotating magnetic field - just as does Tesla's apparatus - each of which can spin up a copper egg - or the Φ TOP[®].



Stopping a Φ TOP[®] With a Magnet

While Tesla's "Egg of Columbus" apparatus can spin up a non-magnetic metal egg or a Φ TOP[®], a permanent magnet held next to a spinning Φ TOP[®] has the opposite effect – stopping it. Both are novel demonstrations of Lenz's Law.



Left: Spinning Aluminum Φ TOP[®]



Right: Spin Damped by Magnet