

GD300

# Time + Motion + GD

WEEK  
TWO

*does anybody have any*  
**QUESTIONS?**



*A Line is a Dot that  
went for a walk.*

— PAUL KLEE

*Every drawing can be  
understood as a motion  
study since it is a path  
of motion recorded by  
graphic means.*

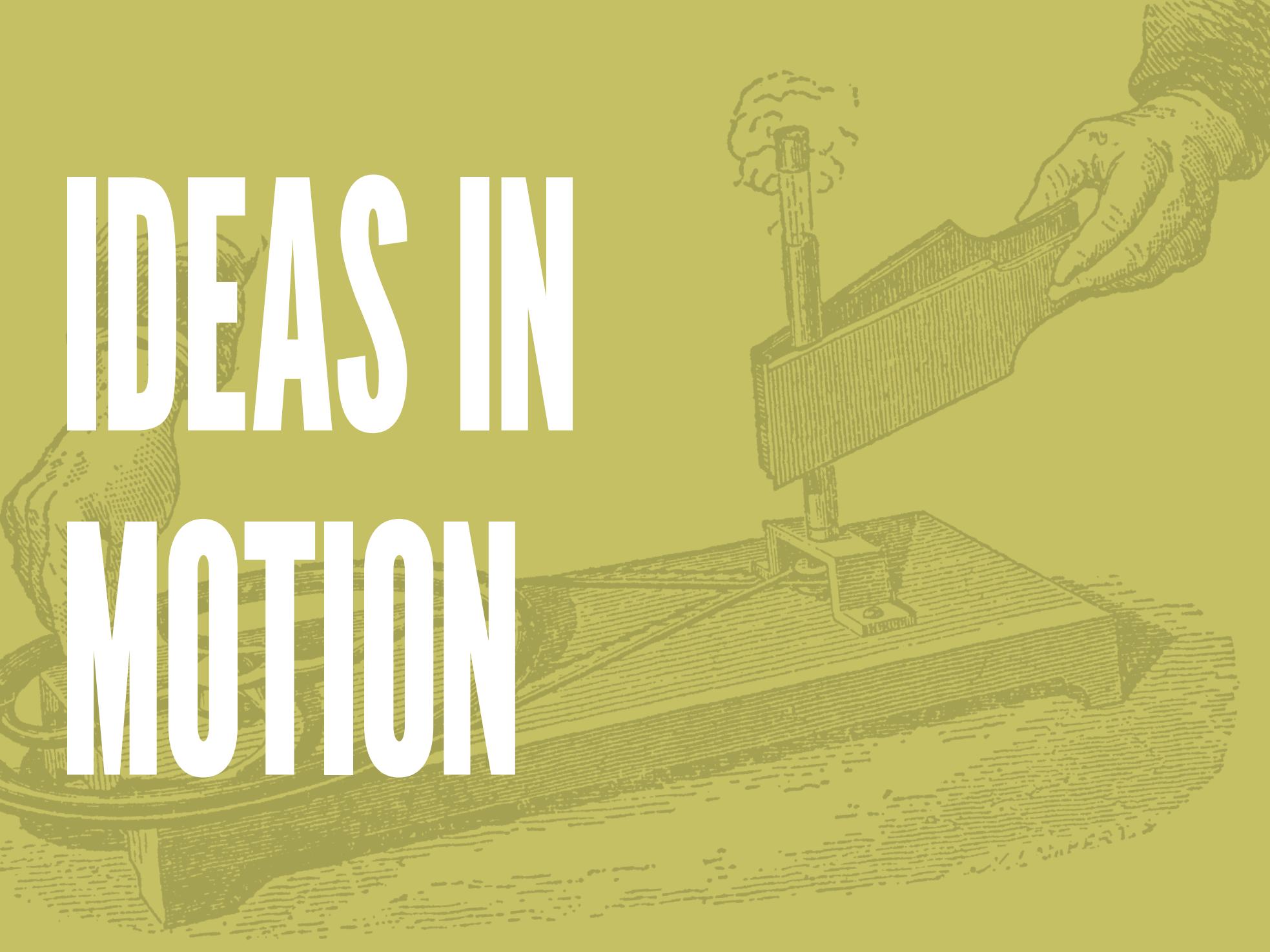
— LÁZLÓ MOHOLY-NAGY



anything else from the

**READING?**

# IDEAS IN MOTION



## **DEFINITION:**

# Motion:

*a change in place or  
location over time ...*

\* This is technically “velocity” in physics

**DEFINITION:**

Motion:  
*change over time.*

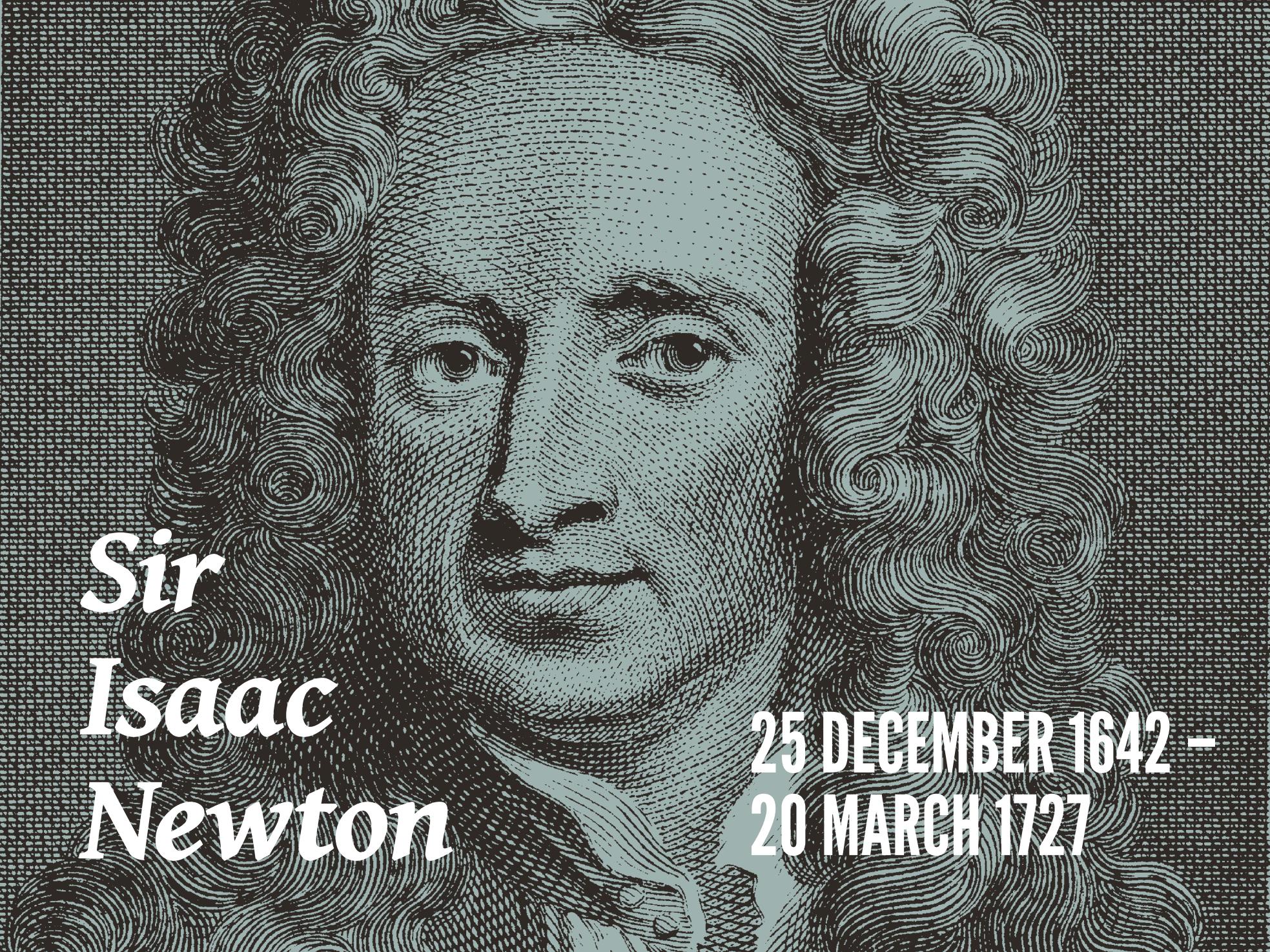
# HISTORICAL + THEORETICAL CONTEXT





# Newton

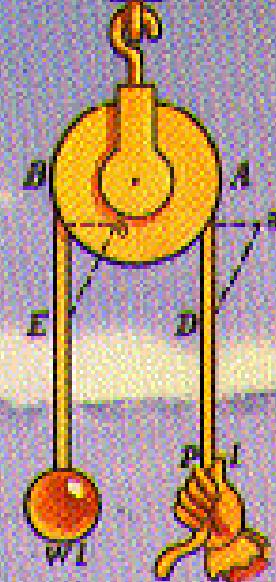
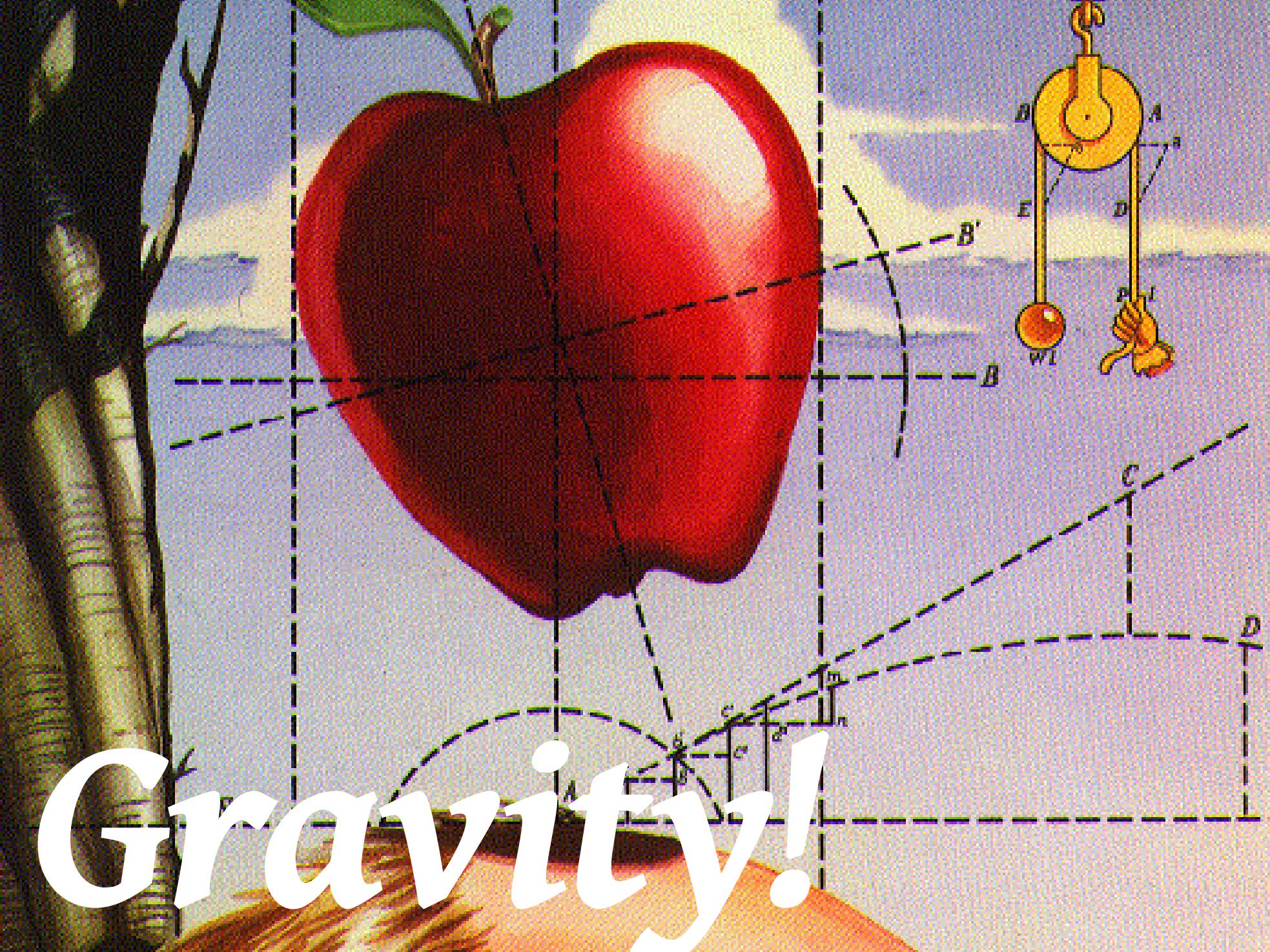
newtonian (or classical) mechanics

An engraving of Sir Isaac Newton's face, rendered in a style that resembles a portrait with swirling, cloud-like patterns emanating from his head, particularly on the right side.

# Sir Isaac Newton

25 DECEMBER 1642 –  
20 MARCH 1727

# Gravity!



$$.5) = \frac{v(8) - v(7)}{8-7} = -.1 \frac{\text{miles}}{\text{min}^2}$$

is the total distance traveled in 12 min.

$$\begin{aligned} \text{dist} &= \int_0^2 v(t) dt - \int_2^4 v(t) dt + \int_4^{12} v(t) dt \\ &= .2 + .2 + 1.4 = 1.8 \text{ miles} \end{aligned}$$

$$c) \int_0^{12} \frac{2}{5} \sin \frac{\pi}{12} t dt$$

$$\frac{2}{5} \int_0^{12} \sin u du$$

$$[\cos\left(\frac{\pi}{12}t\right)]_0^{12}$$



# Calculus!

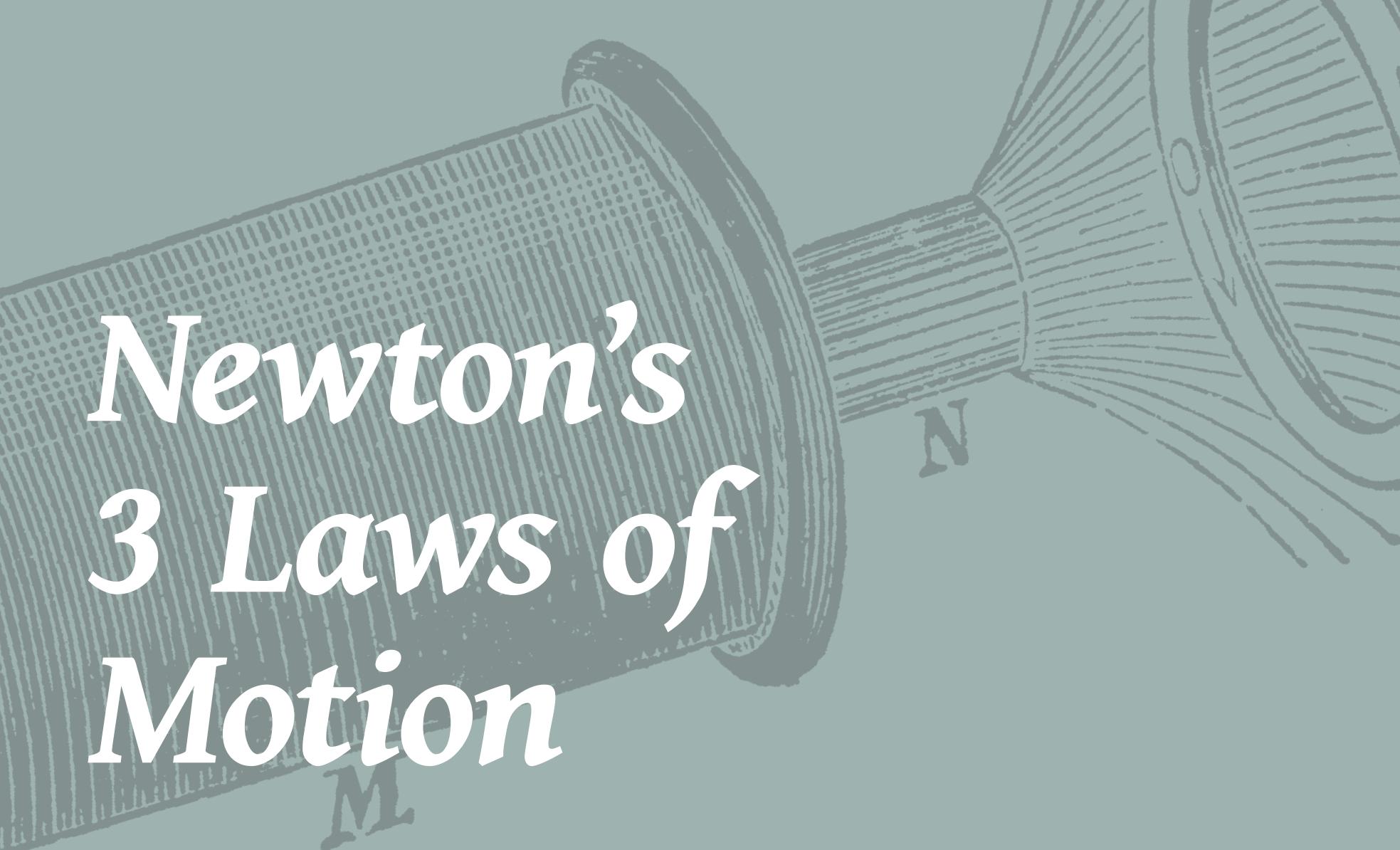
# *Newton Disc*

**PERSISTANCE OF VISION**

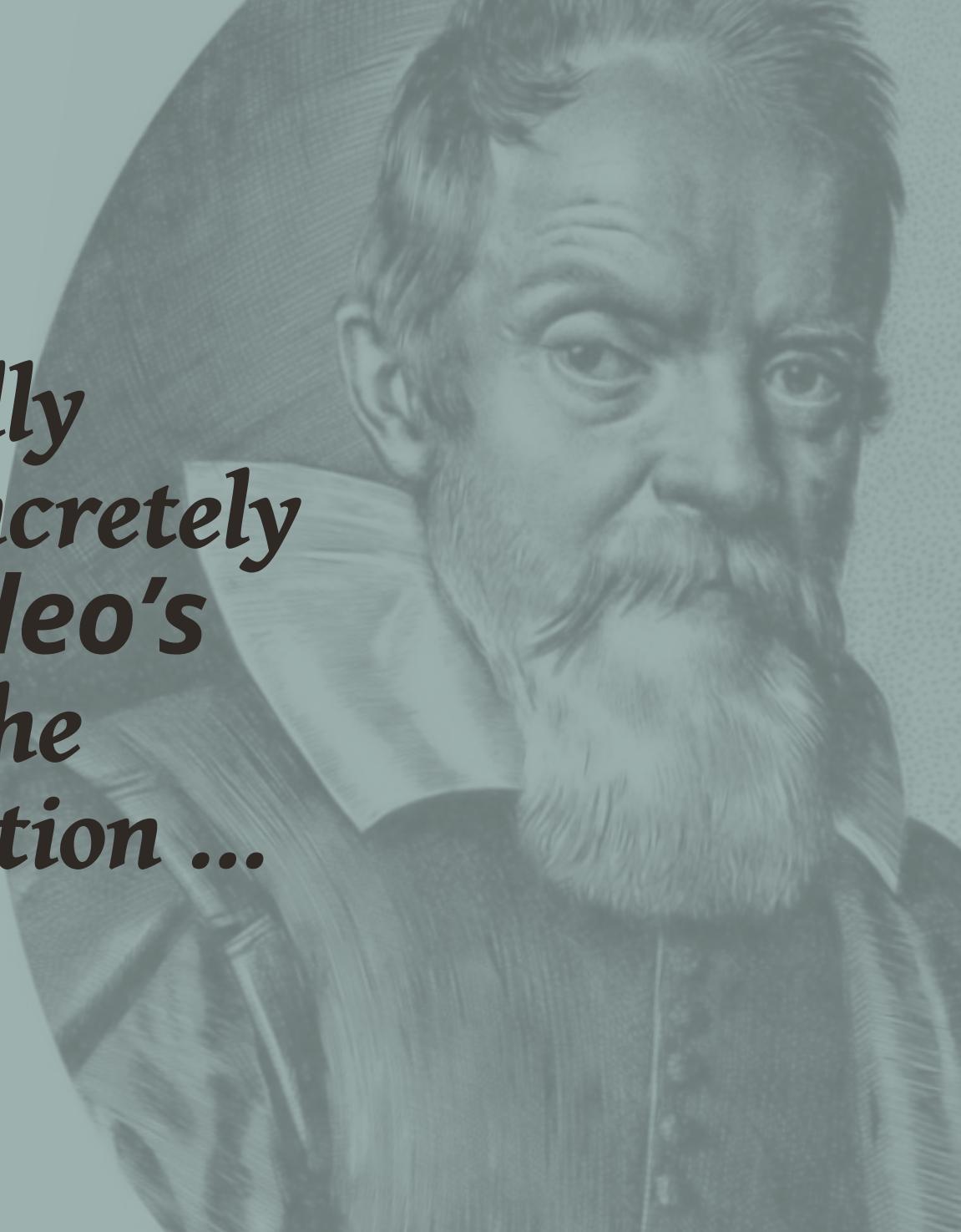


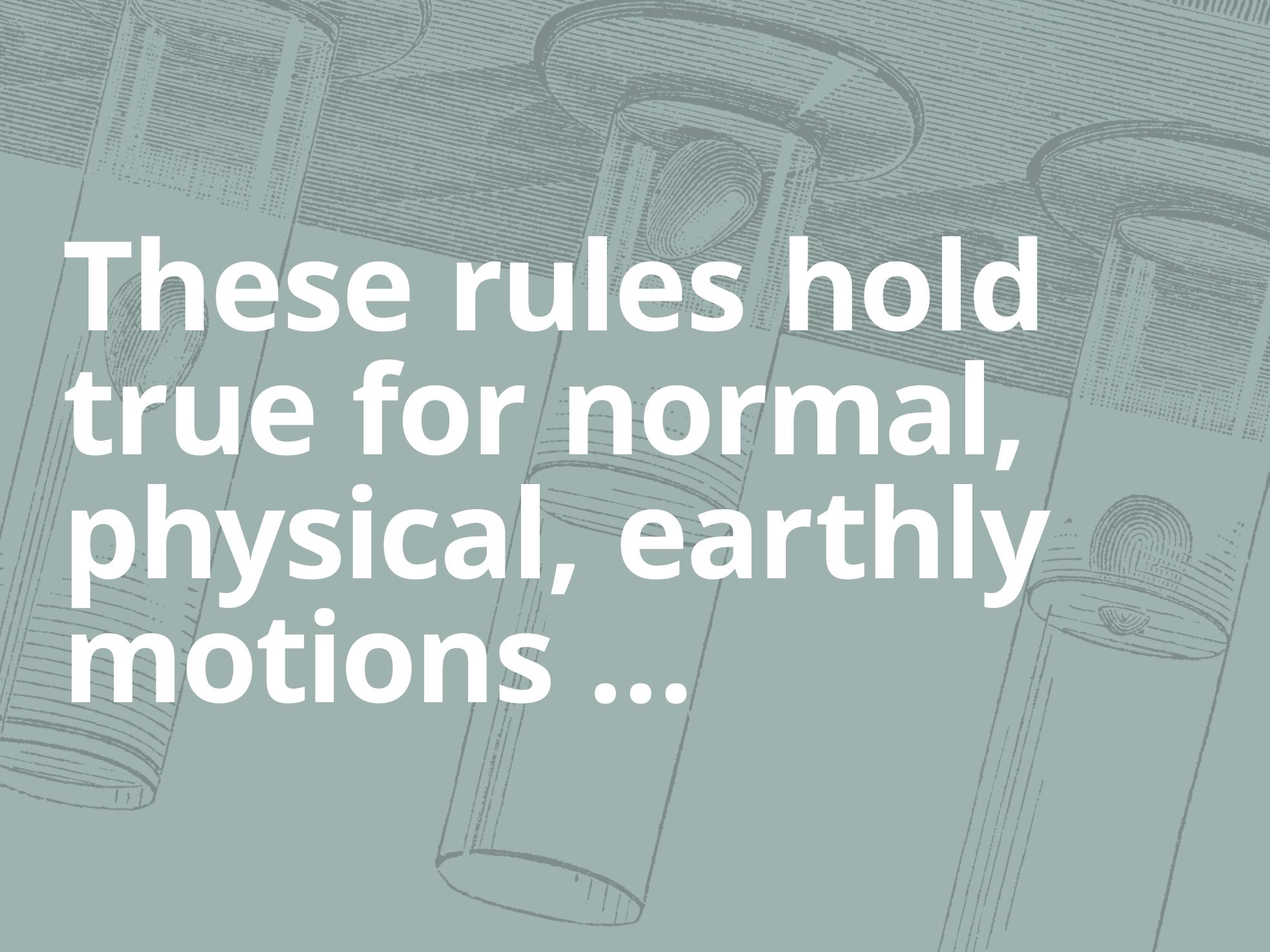


# *Newton's 3 Laws of Motion*



*Newton really  
just more concretely  
phrased Galileo's  
thinking on the  
subject of motion ...*





These rules hold  
true for normal,  
physical, earthly  
motions ...



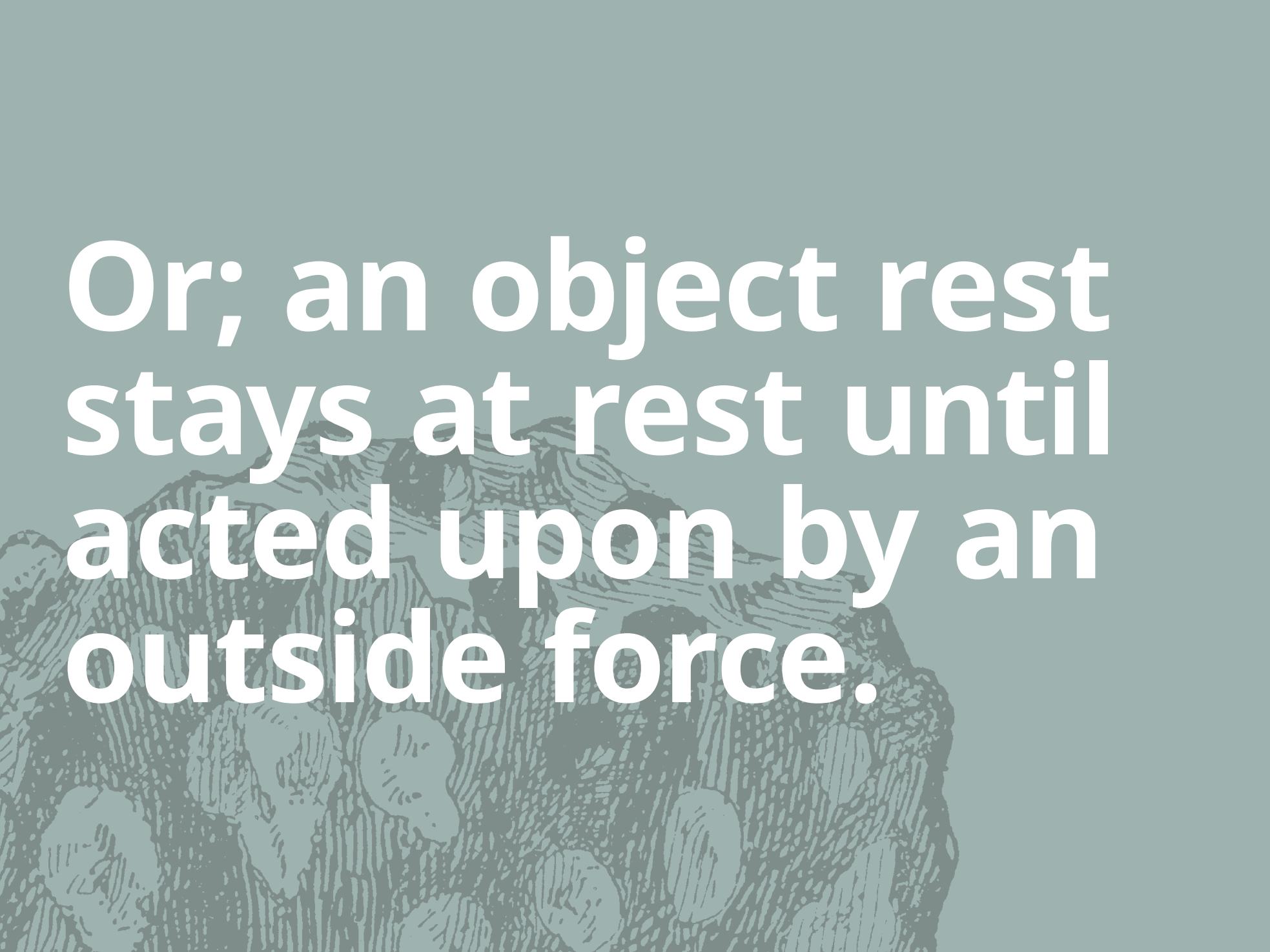




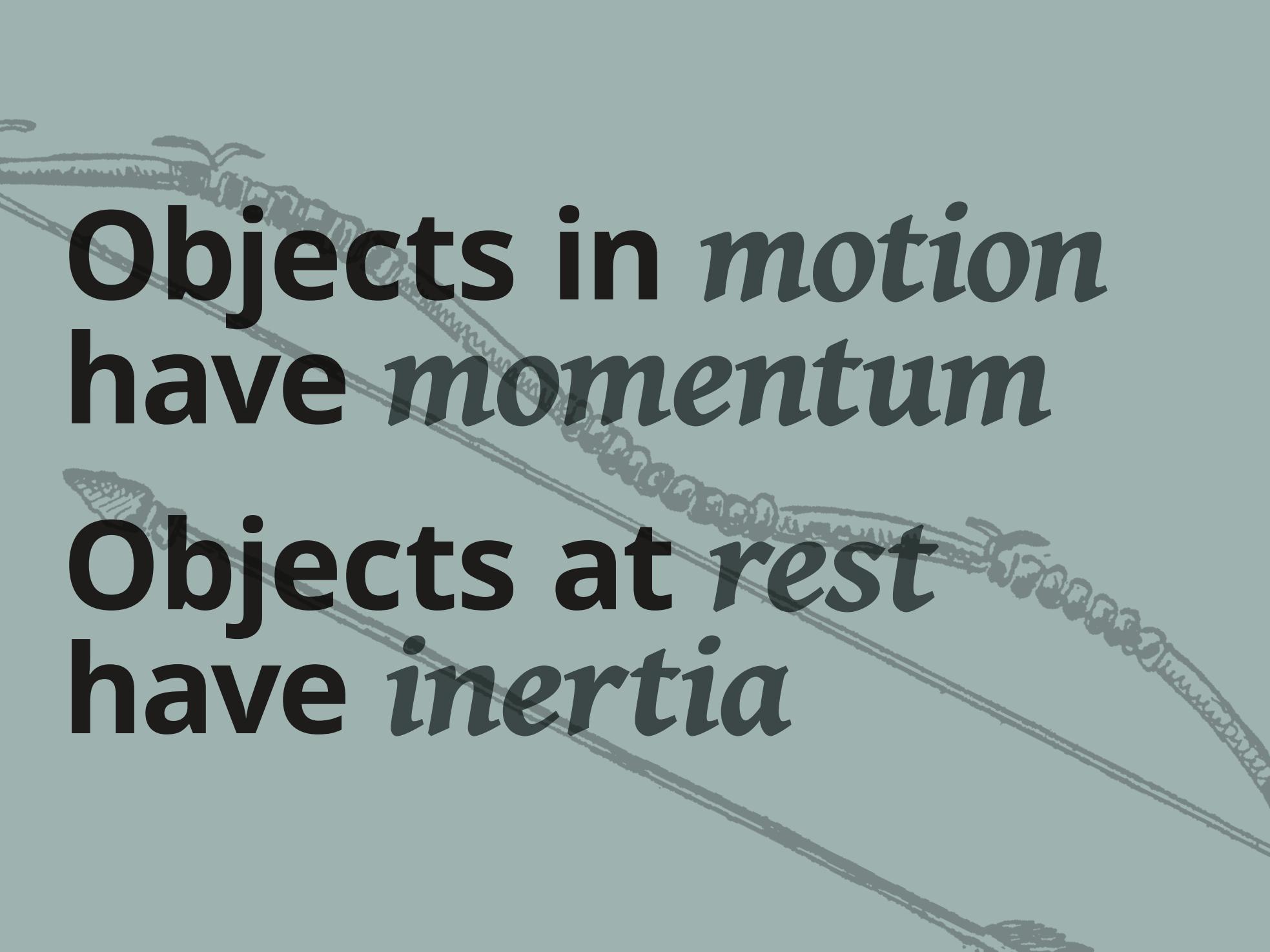
## LAW 1:

An object in motion stays at motion until acted upon by an outside force.



A black and white illustration of a person sitting cross-legged on a large, textured rock, looking up at the sky.

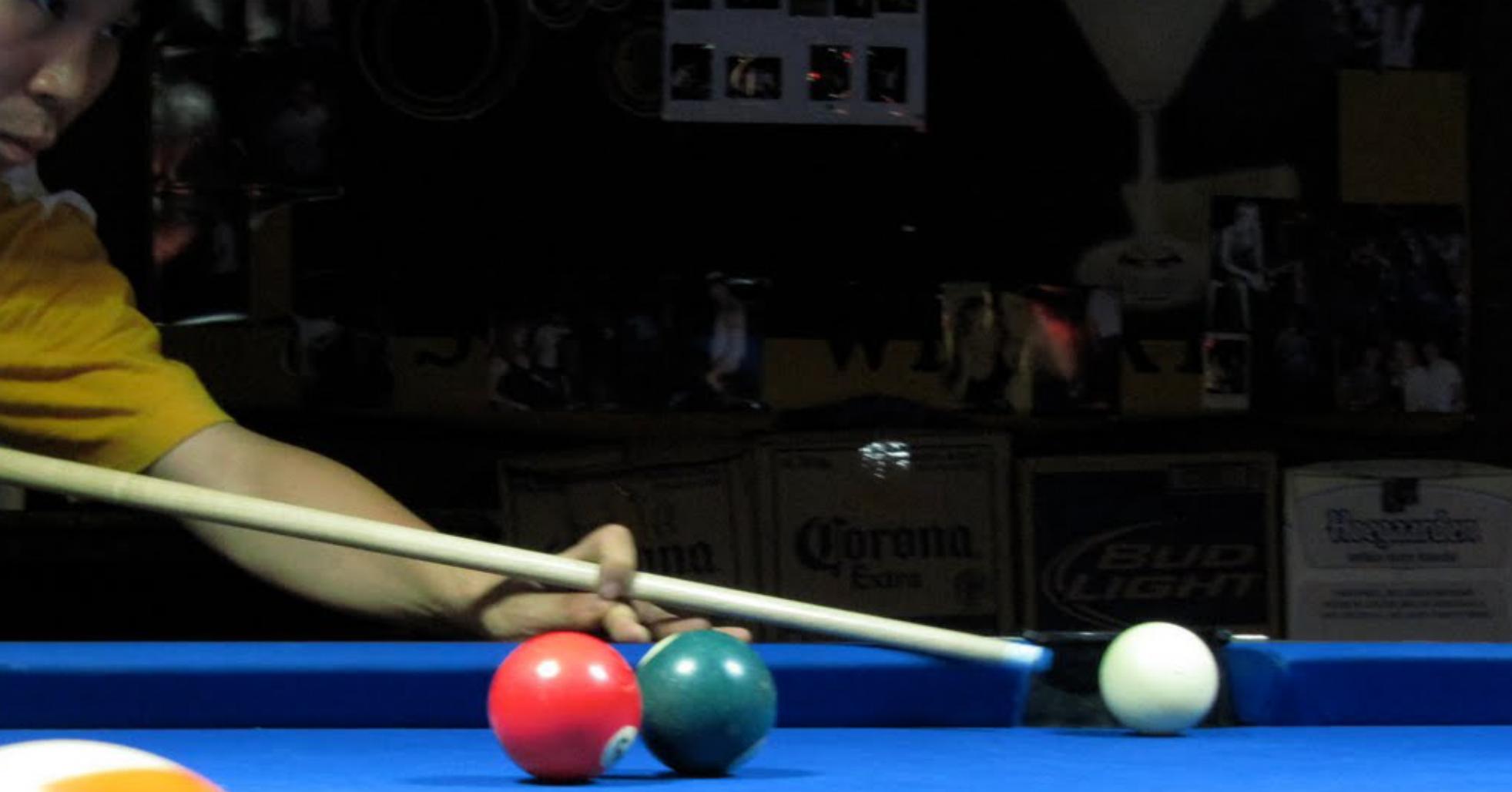
Or; an object rest  
stays at rest until  
acted upon by an  
outside force.



**Objects in *motion***  
**have *momentum***

**Objects at *rest***  
**have *inertia***





## **LAW 2:**

The relationship between an object's mass  $m$ , its acceleration  $a$ , and the applied force  $F$  is  $F = ma$ .

**LAW 2:**

**Acceleration and force have direction; the direction of the force is the same as the direction of the acceleration.**

Heavier objects  
require more force  
to move the same  
speed as lighter  
objects

Objects will move in the same direction as the force applied to them moves.





**LAW 3:**

For every action  
there is an equal  
and opposite  
reaction.



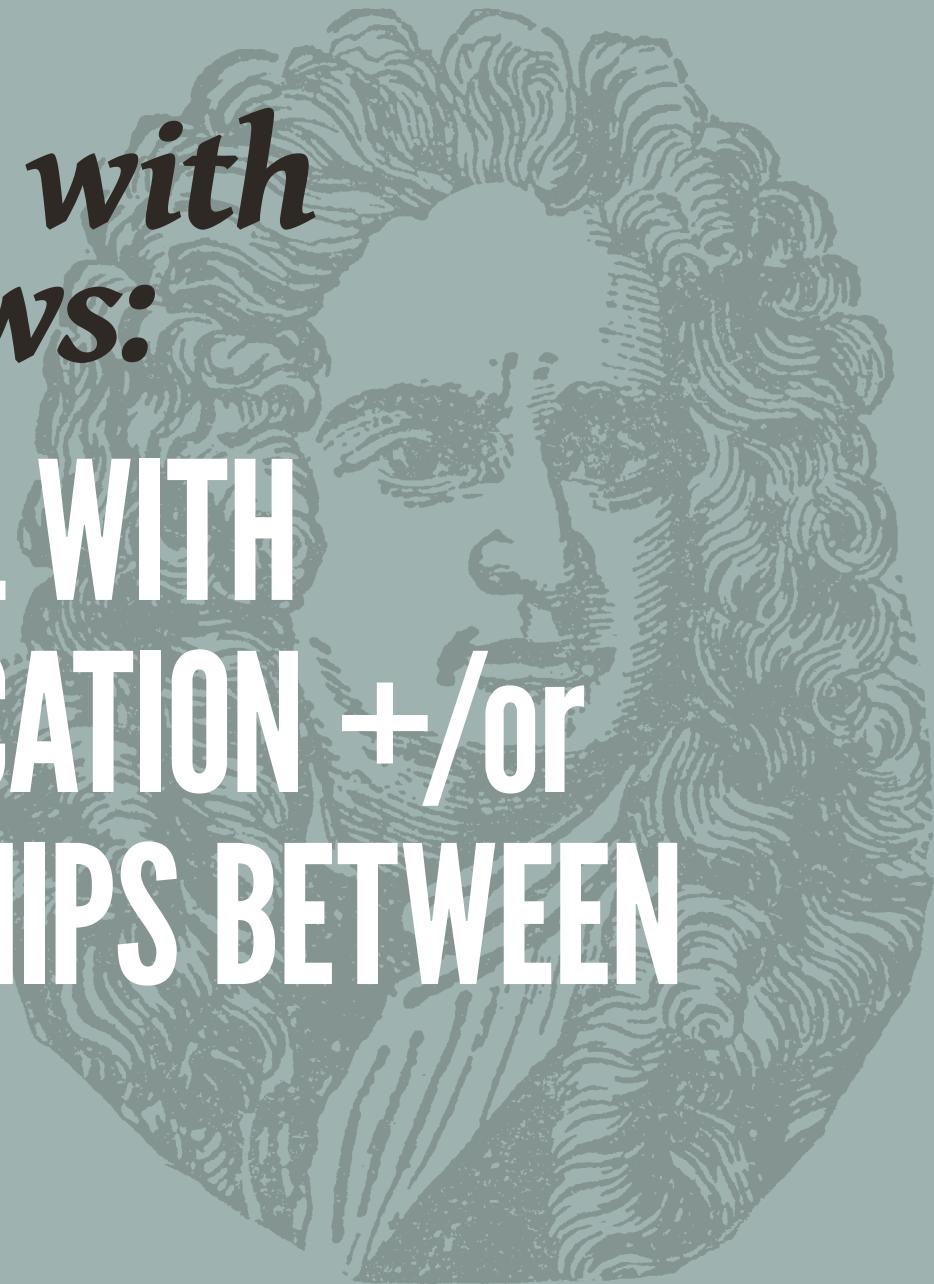






*The problem with  
Newton's Laws:*

**THEY ONLY DEAL WITH  
CHANGES IN LOCATION +/or  
THE RELATIONSHIPS BETWEEN  
OBJECTS ...**



*does anybody have any*  
**QUESTIONS?**



A black and white photograph of a person's hand holding a pencil, writing on a dark, textured surface. The hand is positioned diagonally across the frame, with the pencil pointing towards the top right. The background is a solid dark grey.

*for ideas more relevant*

# **TO DESIGN,**

*we need to go a little  
farther back ...*

# ARISTOTLE

*384 BC - 322 BC*

*Aristotle used the term*

**“MOTION”**

*to describe any kind of*

**CHANGE**

*he describes 4 main  
kinds of  
**CHANGE***

- 
1. Local Motion
  2. Alteration
  3. Growth
  4. Coming to be & Passing Away

*also, he described  
variants of each change  
based something he called*

**CAUSATION**

# **ARTIFICIAL**      vs.      **NATURAL**

*(caused by man)*

*(caused by nature)*

**INTENTIONAL**

**ACCIDENTAL**

**“NATURE”**

*“Works of Art”*

*Artificial  
Happening  
(FIRE)*

*Artificial  
Product  
(HOUSE)*

*artificial motions are aka*

# VIOLENT MOTIONS

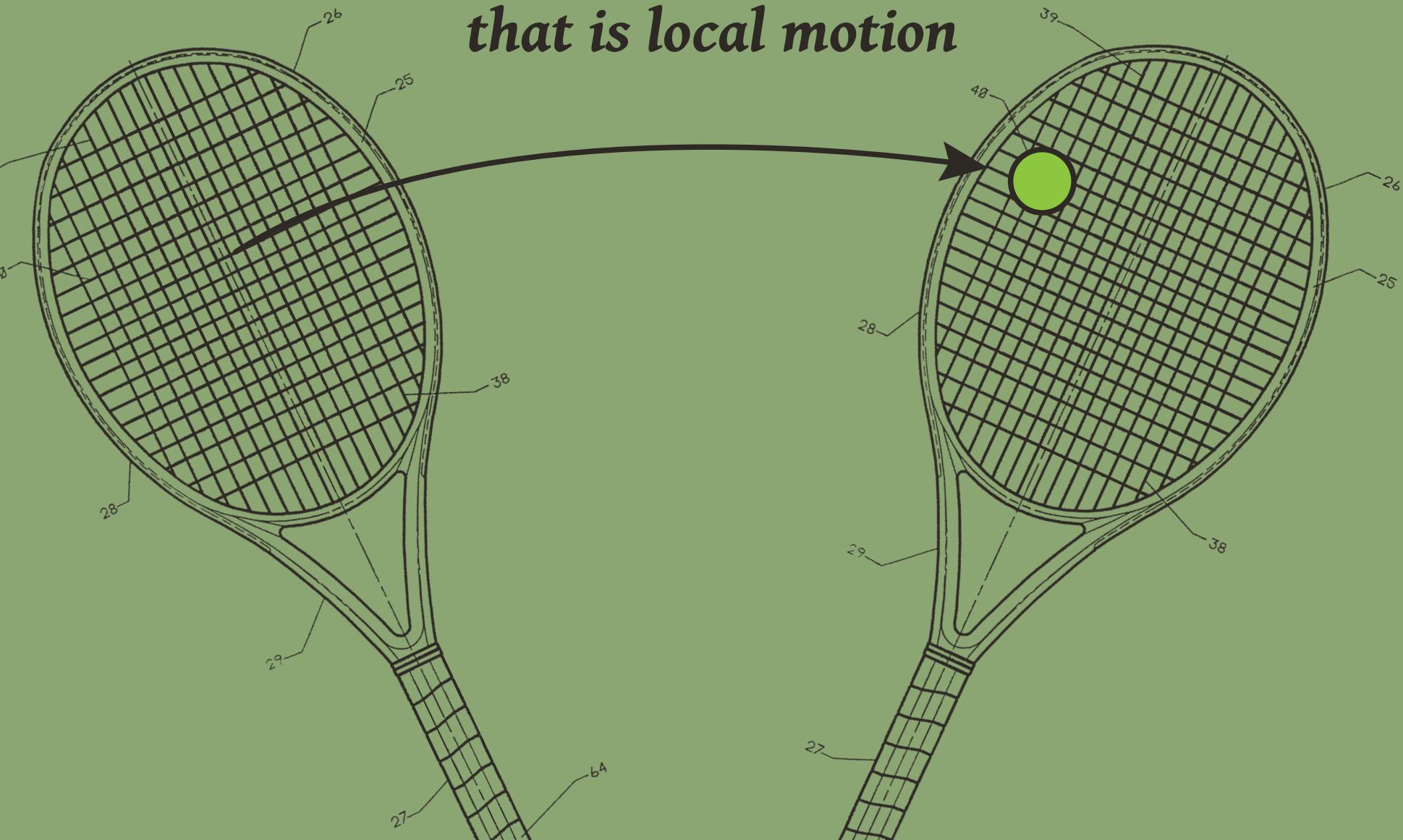
*violent in that they violate natural  
tendencies of objects*

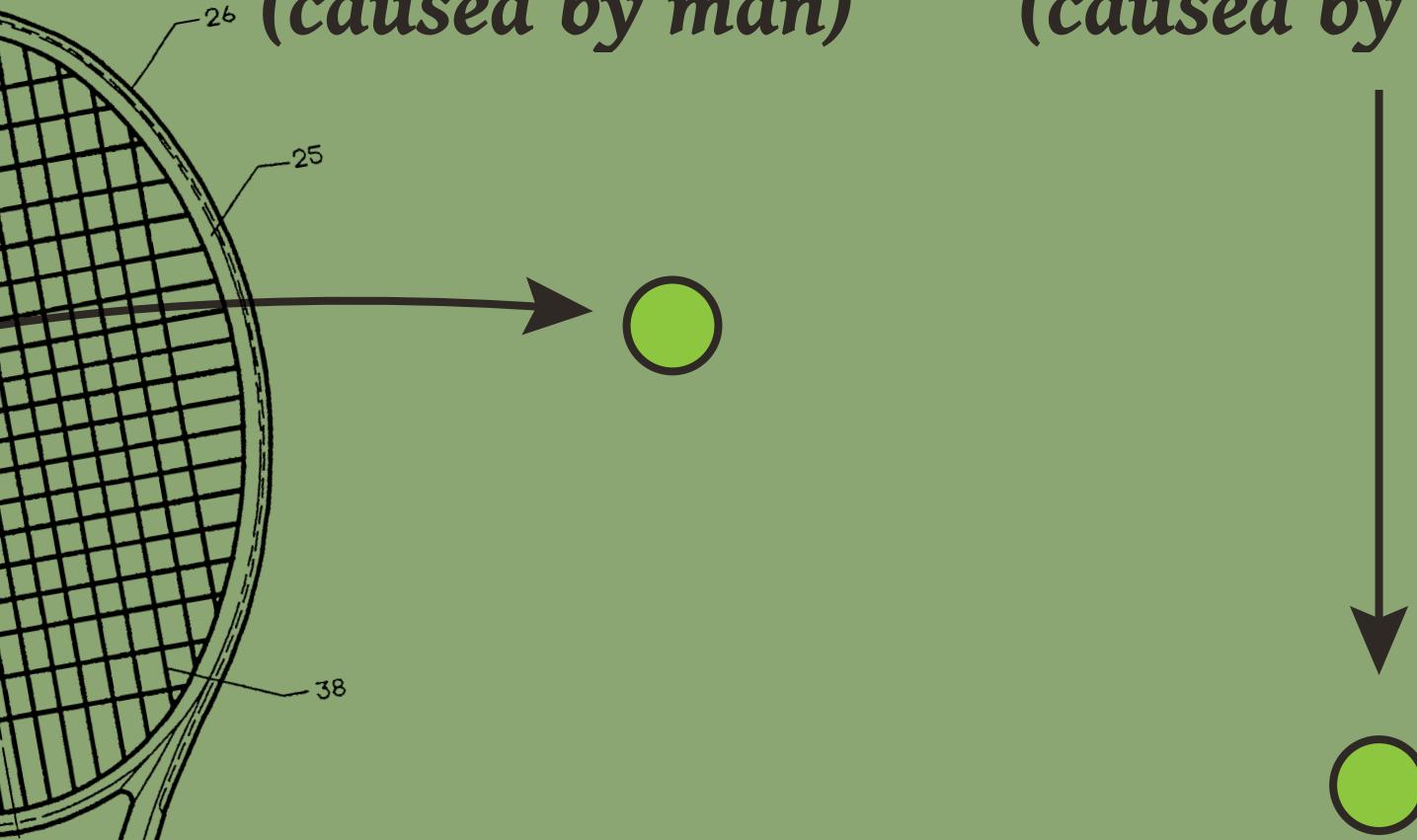
**ARISTOTLE'S CHANGES**  
**FOCUS ON AN OBJECT (OR SOME**  
**ASPECT OF THAT OBJECT) BEING**  
**THE UNCHANGING RECIPIENT OF**  
**EACH KEY TYPE OF CHANGE...**

# LOCAL MOTION

*a change in place*

*the moving thing is the  
unchanging subject of the change  
that is local motion*



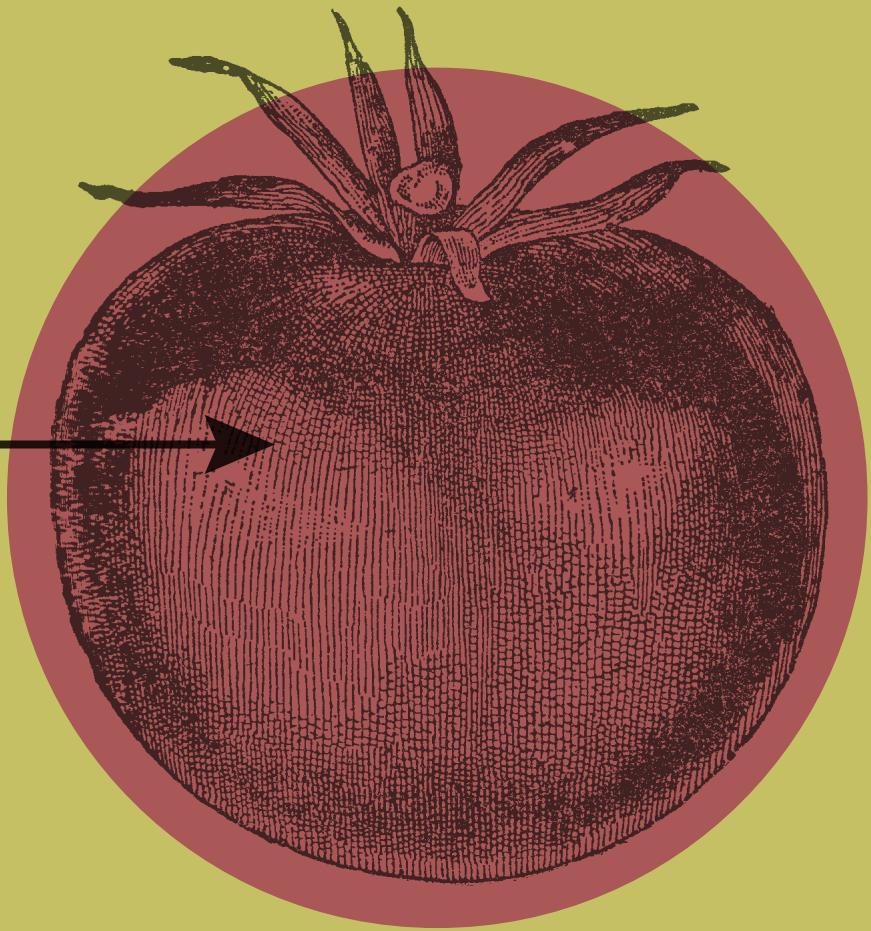


# *hitting vs. dropping*

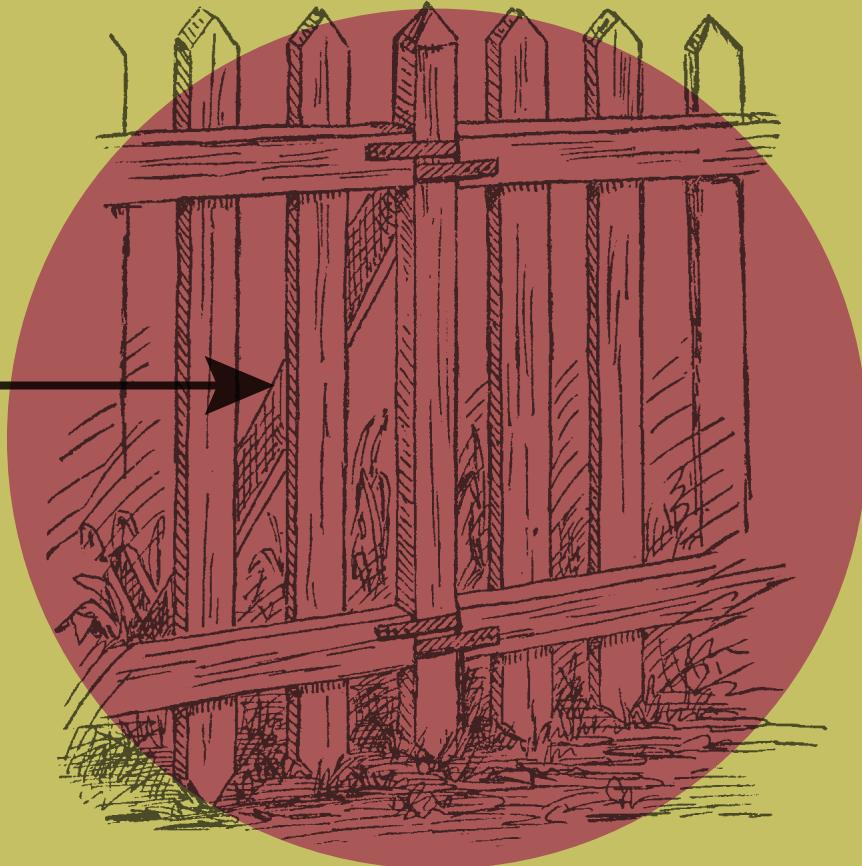
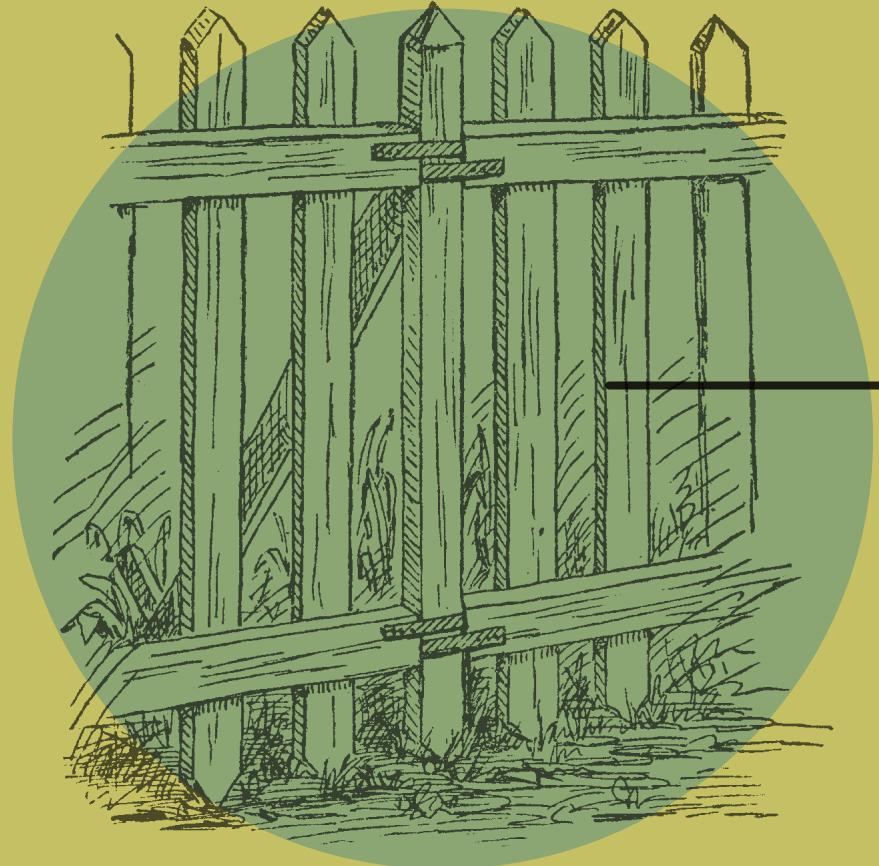
# ALTERATION

*alterations of attributes;  
a change in quality*

*natural*



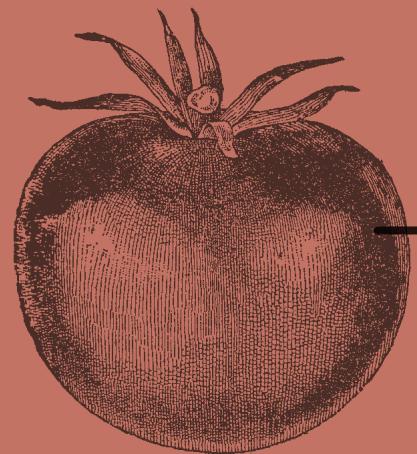
# *artificial*



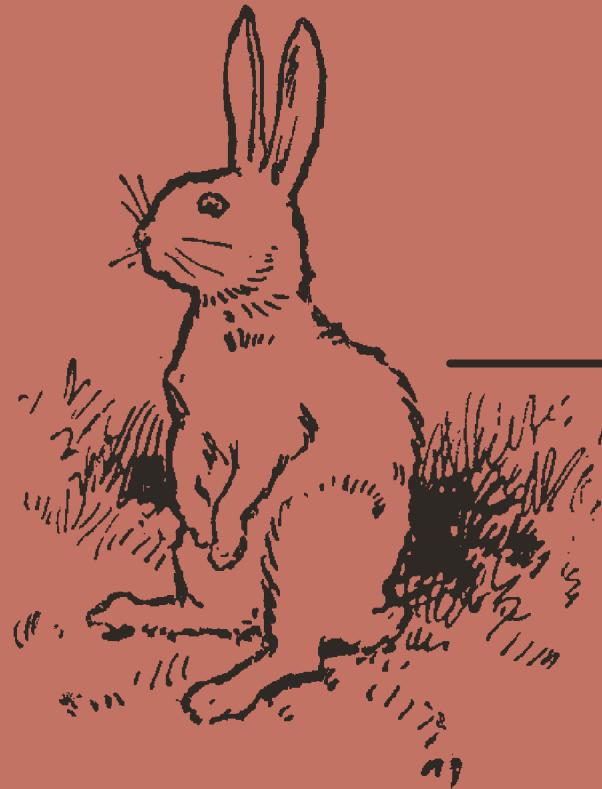
# GROWTH

*a change in quantity*

*natural*



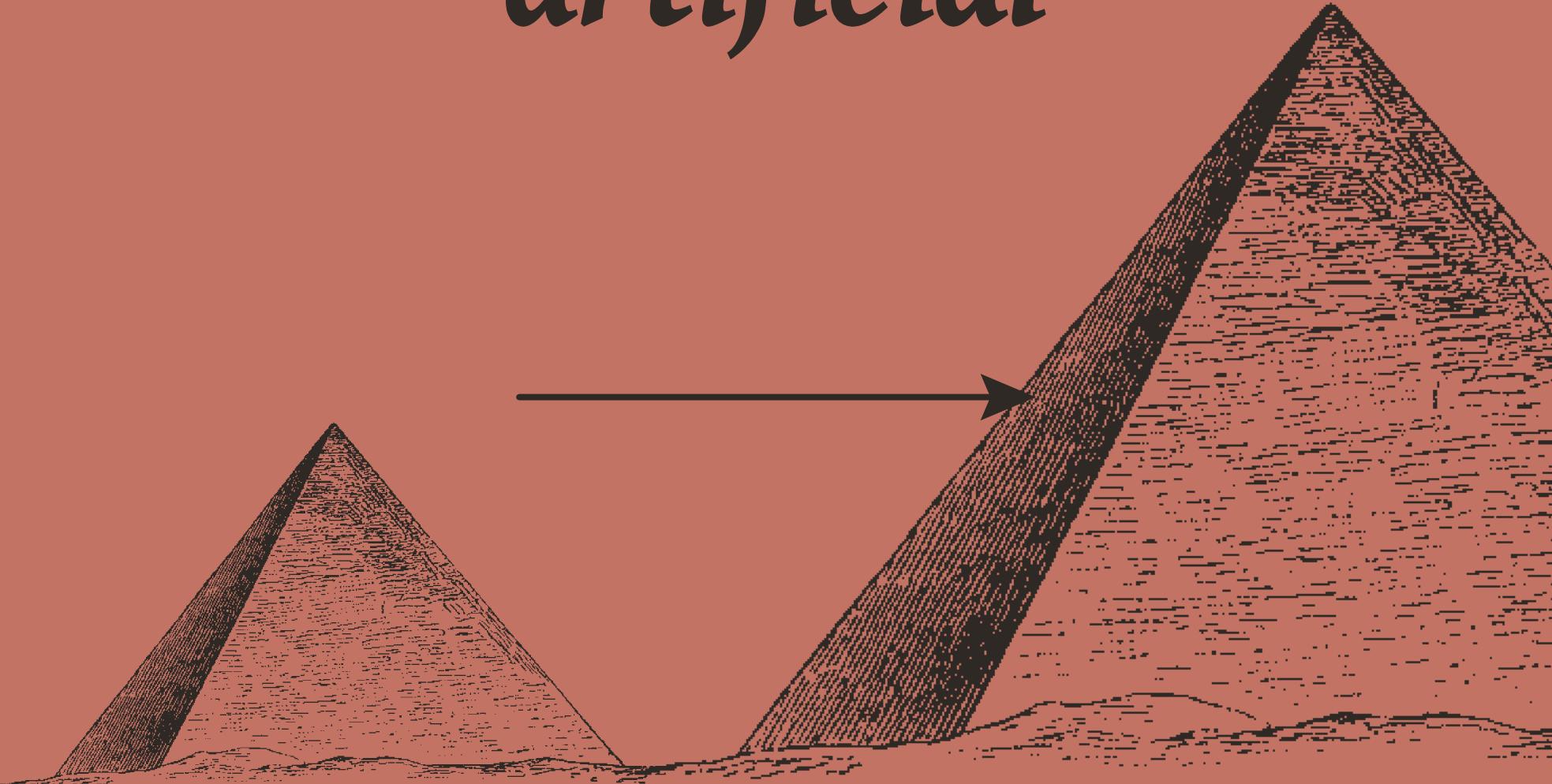
*natural*



*natural*

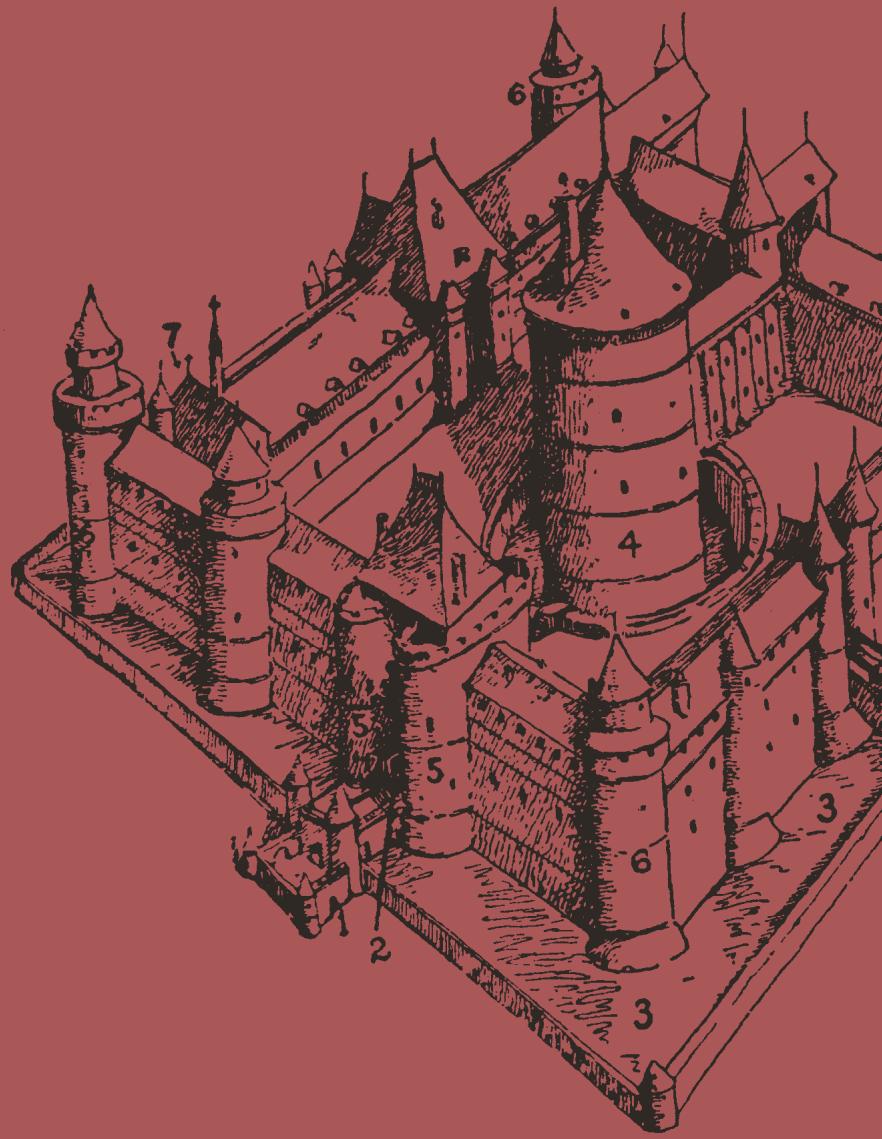
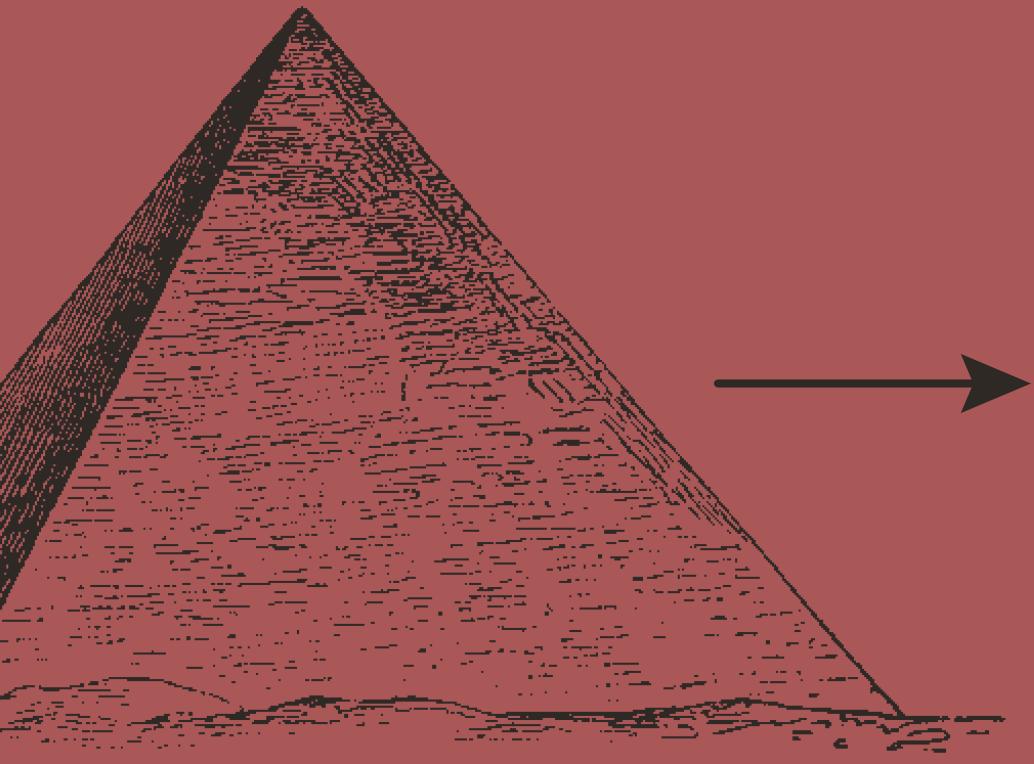


*artificial*

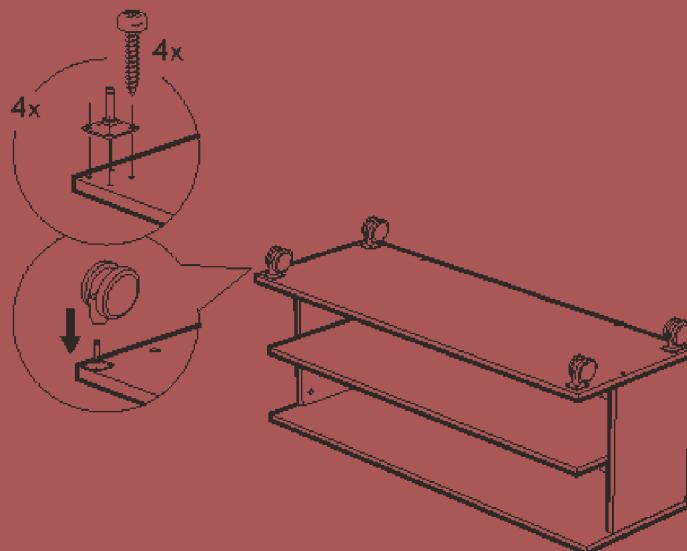


# **COMING TO BE & PASSING AWAY**

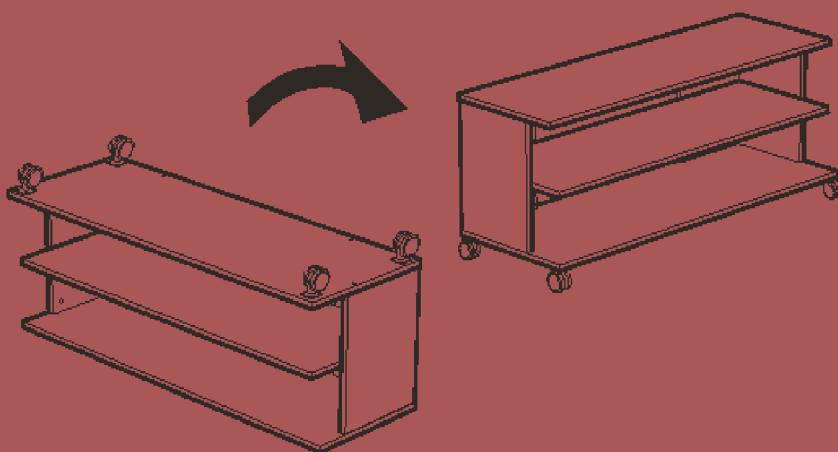
*a change in substance*



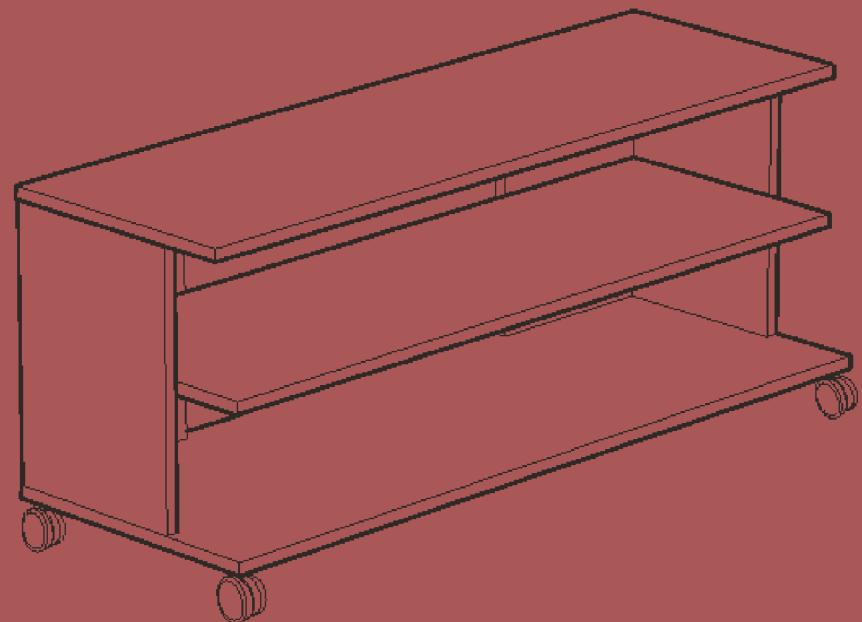
**10**

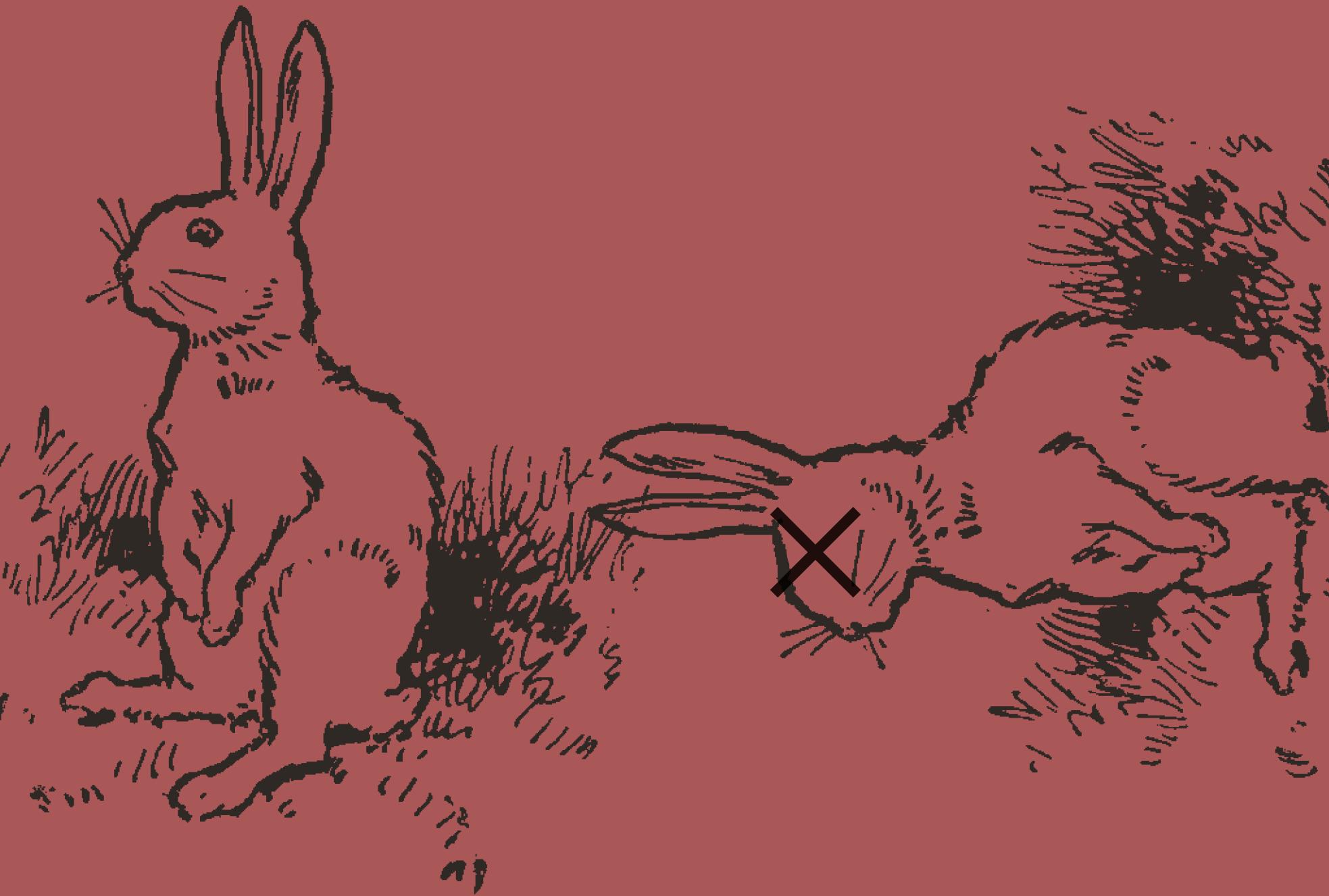


**11**



# BENNO





**AKA**  
**CONSERVATION**  
*of* **MATTER**

**THIS LAST CHANGE IS  
DIFFERENT IN THAT IT HAPPENS  
INSTANTLY, WHERE THE OTHERS  
HAPPEN OVER A PERIOD OF TIME**

*now is the time for*  
**QUESTIONS**



**SO!**

*what does this have to  
do with DESIGN?*

# Basic forms of Motion ...



Newton gives us  
**CHANGE IN POSITION**



Aristotle confirms  
**CHANGE IN POSITION**  
With his type of change:  
**LOCAL MOTION**



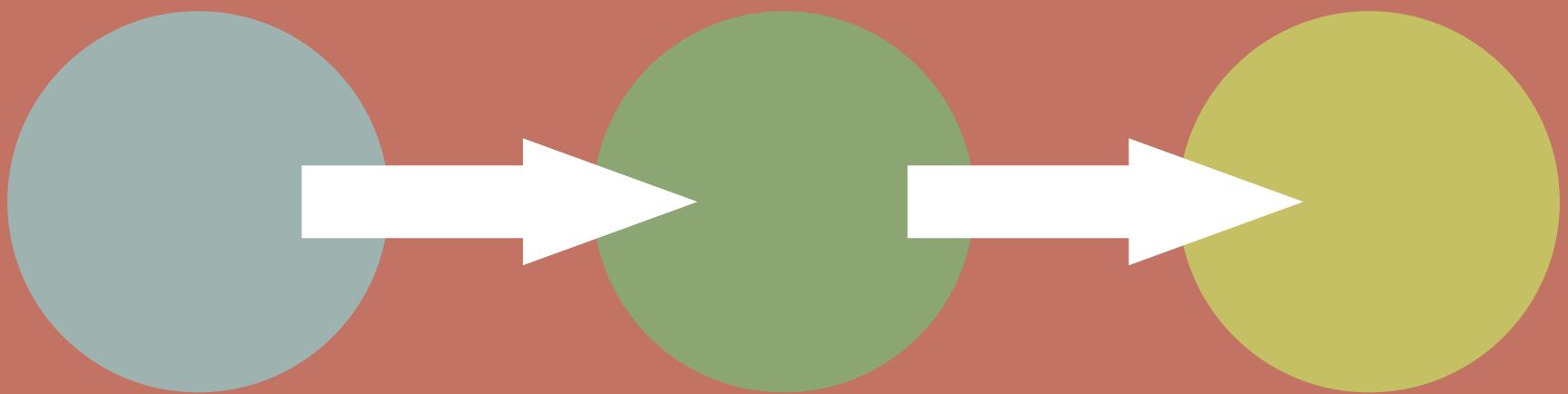
Aristotle then adds

**CHANGE IN QUALITY**  
**CHANGE IN QUANTITY**

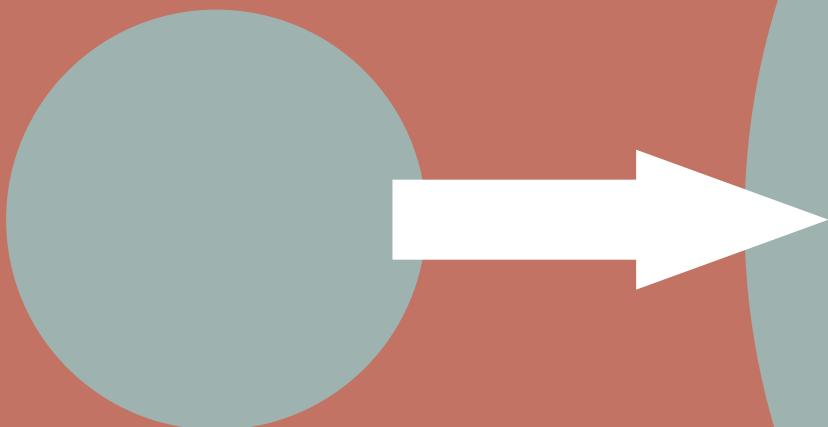
and

**CHANGE IN  
SUBSTANCE**

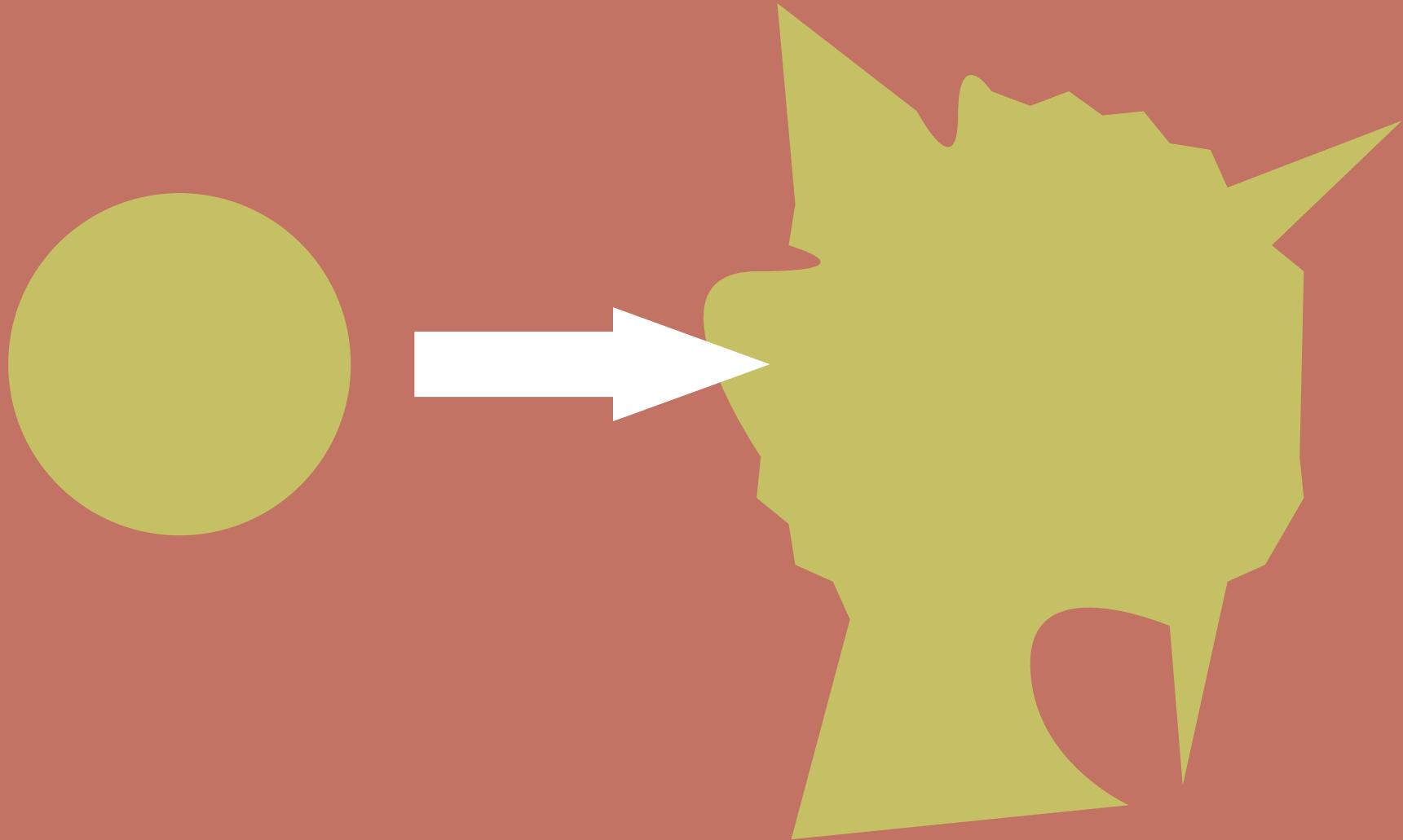
# CHANGE IN COLOR



# CHANGE IN SCALE



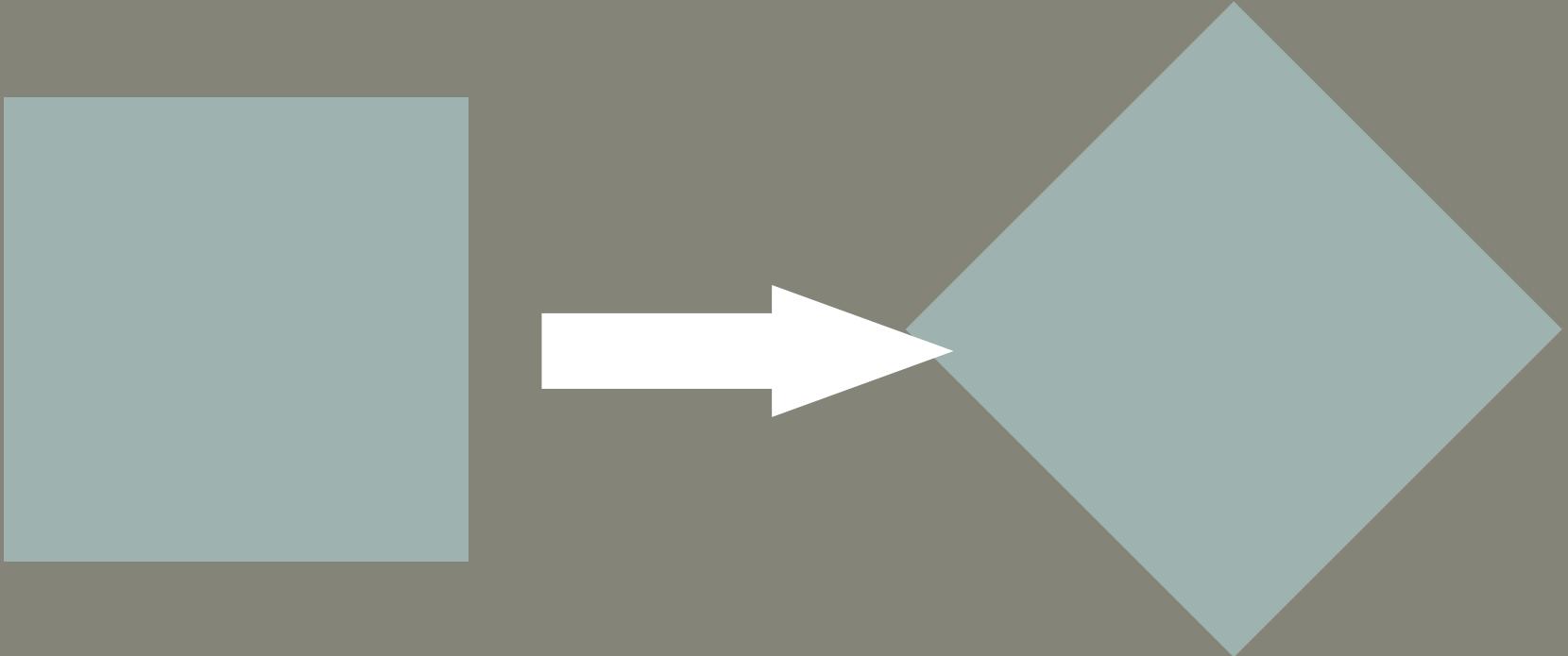
# CHANGE IN SHAPE



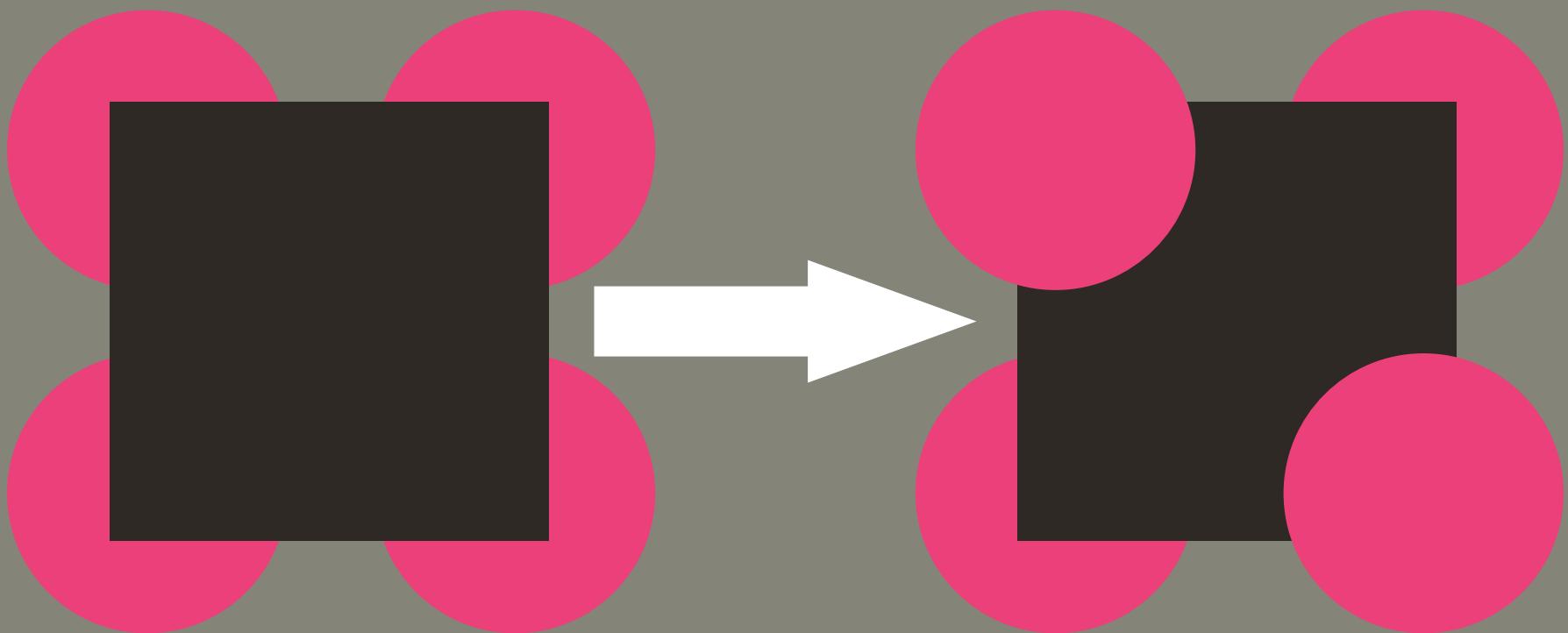
so there's that...  
and, we can actually  
add a few more

**LIKE:**

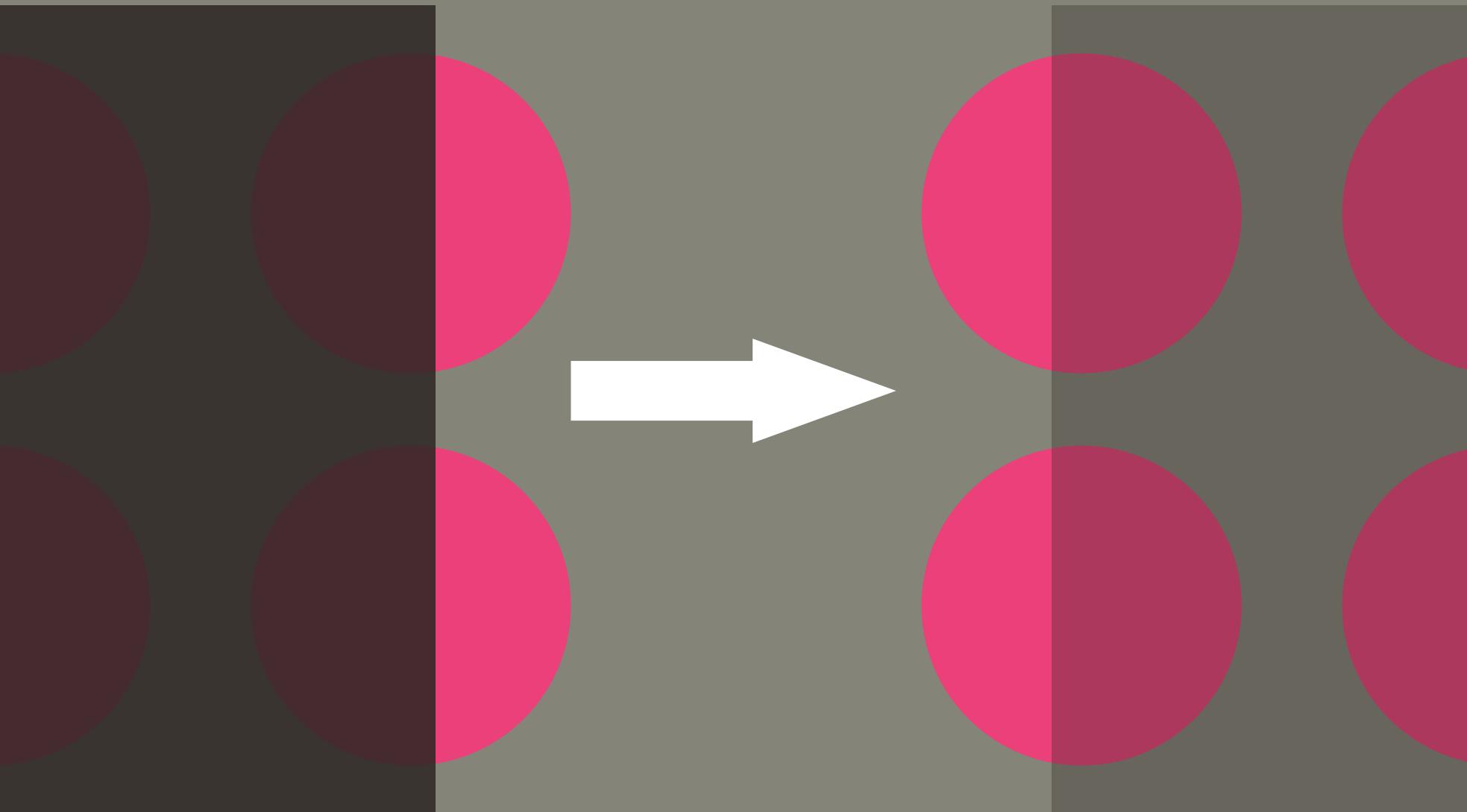
# CHANGE IN ROTATION



# CHANGE IN DEPTH



# CHANGE IN TRANSPARENCY



# **BASIC FORMS OF MOTION ...**

- 1. Change Position**
- 2. Change Color**
- 3. Change Scale**
- 4. Change Shape**
- 5. Change Rotation**
- 6. Change Depth**
- 7. Change Transparency**



**Sounds a lot  
like general basic  
design principles**

...

*are there any*  
**QUESTIONS?**



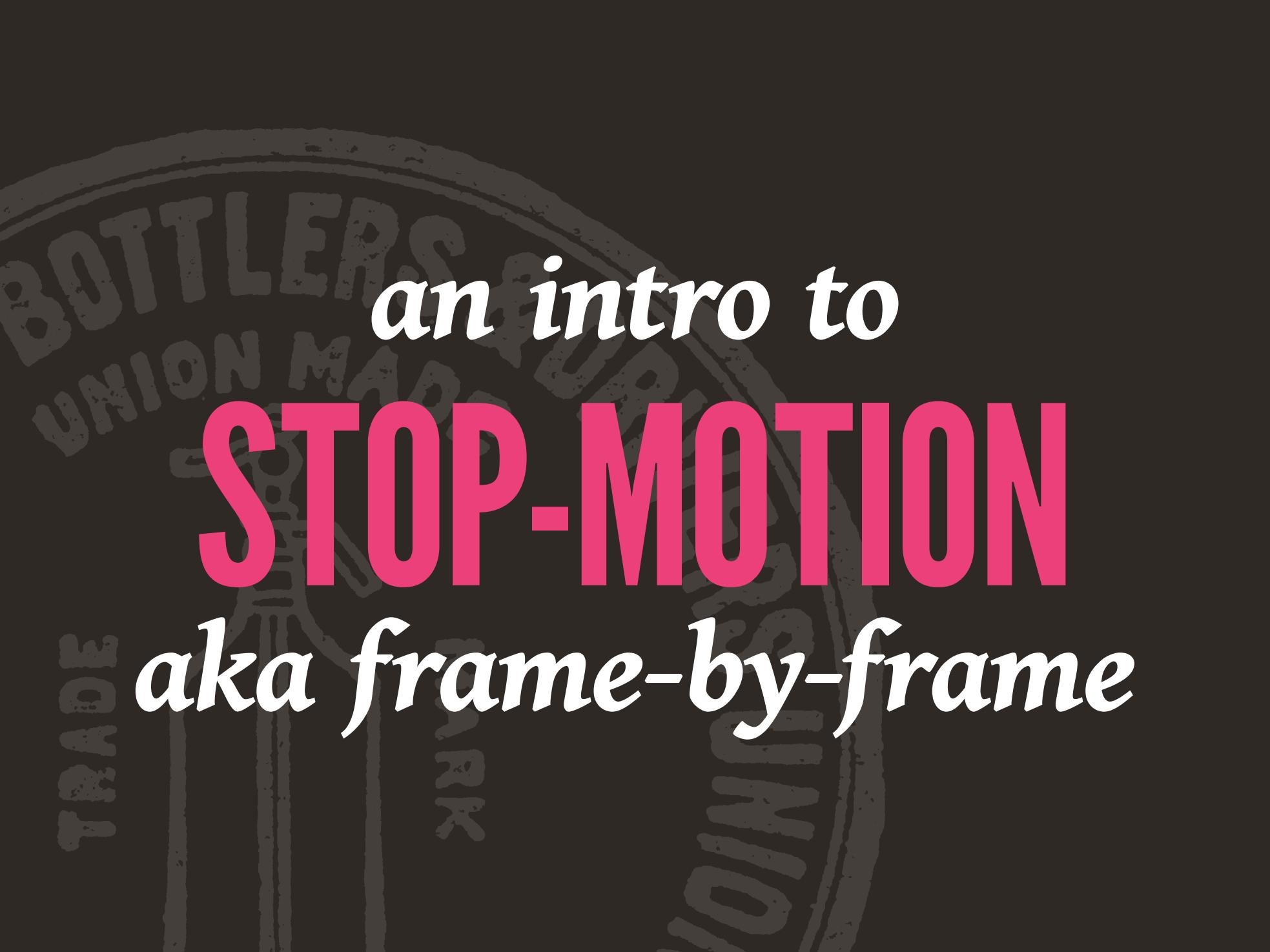


*a quick*  
**BREAK.**



*& now for a*

**DEMO**



*an intro to*

# **STOP-MOTION**

*aka frame-by-frame*



various ways of  
**DIGITIZING**  
your frames

*time for a*  
**PROJECT**

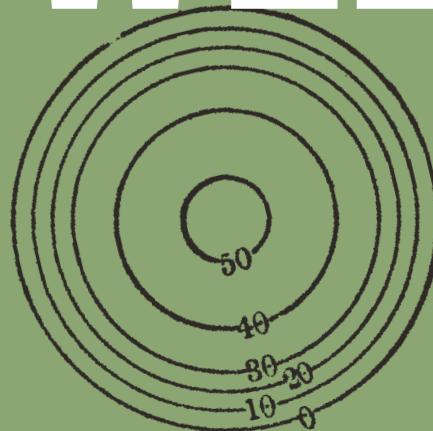
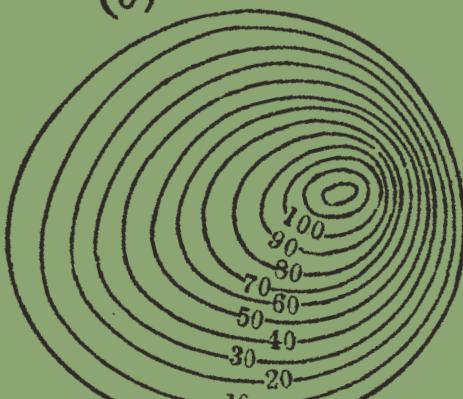
*now, make something  
USING ALL 7  
modes-of-change*

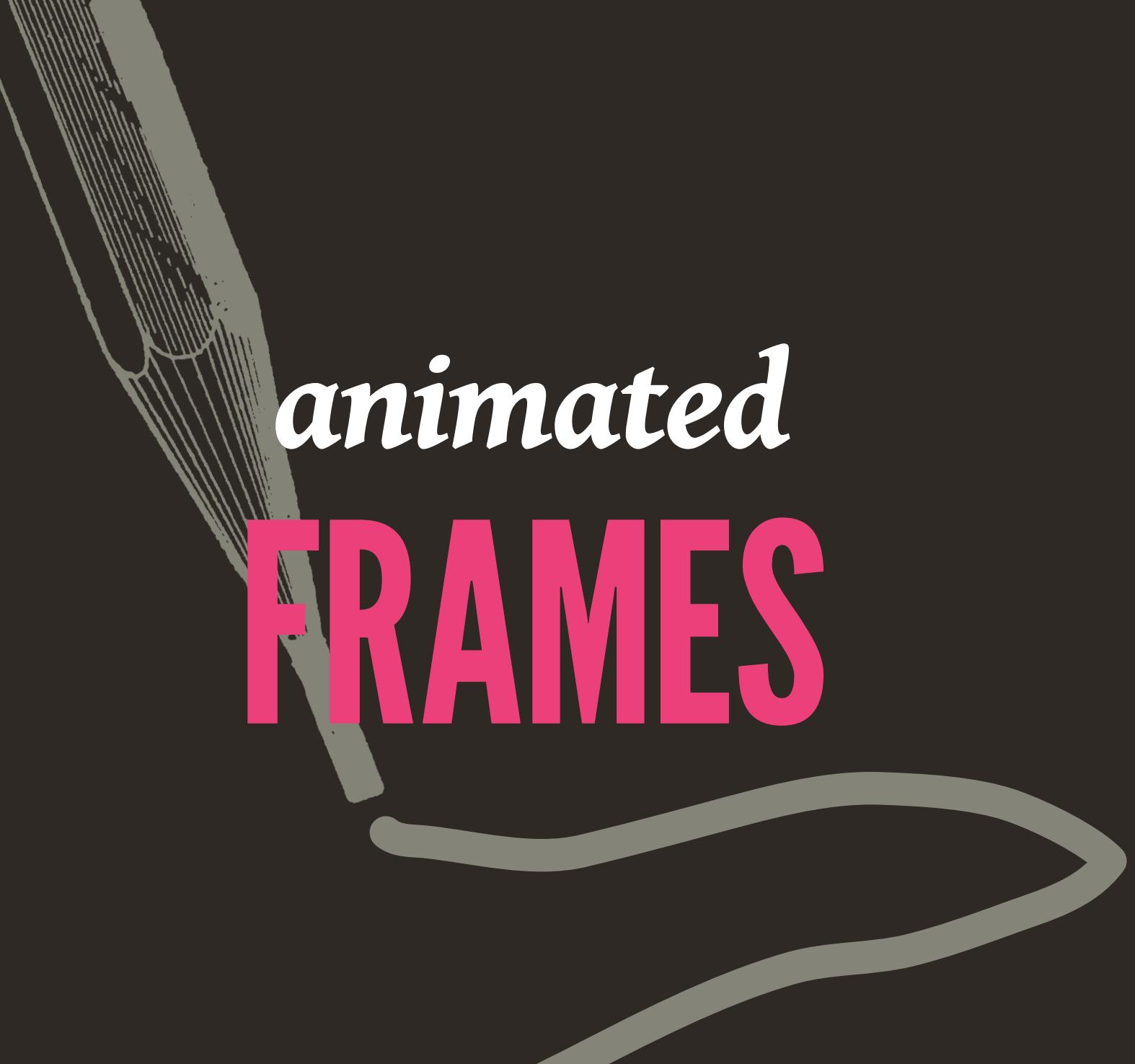
*are there any*  
**QUESTIONS?**



# FOR NEXT WEEK

(b)





*animated*  
**FRAMES**

A collage of comic book panels featuring various superhero characters and comic book titles. In the foreground, there's a large panel showing Iron Man's hand holding a glowing cube. Behind it, another panel shows a hand holding a glowing orb. Other panels include a woman in a red suit, a man in a blue suit, and a man in a green suit. There are also panels with text like "WONDERS OF COMICS", "THE INVISIBLE MAN", and "JOHN McCLOUD".

# 1. Get: *Understanding Comics*

**2. Read Ch. 1  
and Ch. 3 for  
next week**

3. Next Wk Bring  
your ideas &  
work for Proj-  
ect 1 so far

*are there any*  
**QUESTIONS?**



**FIN.**