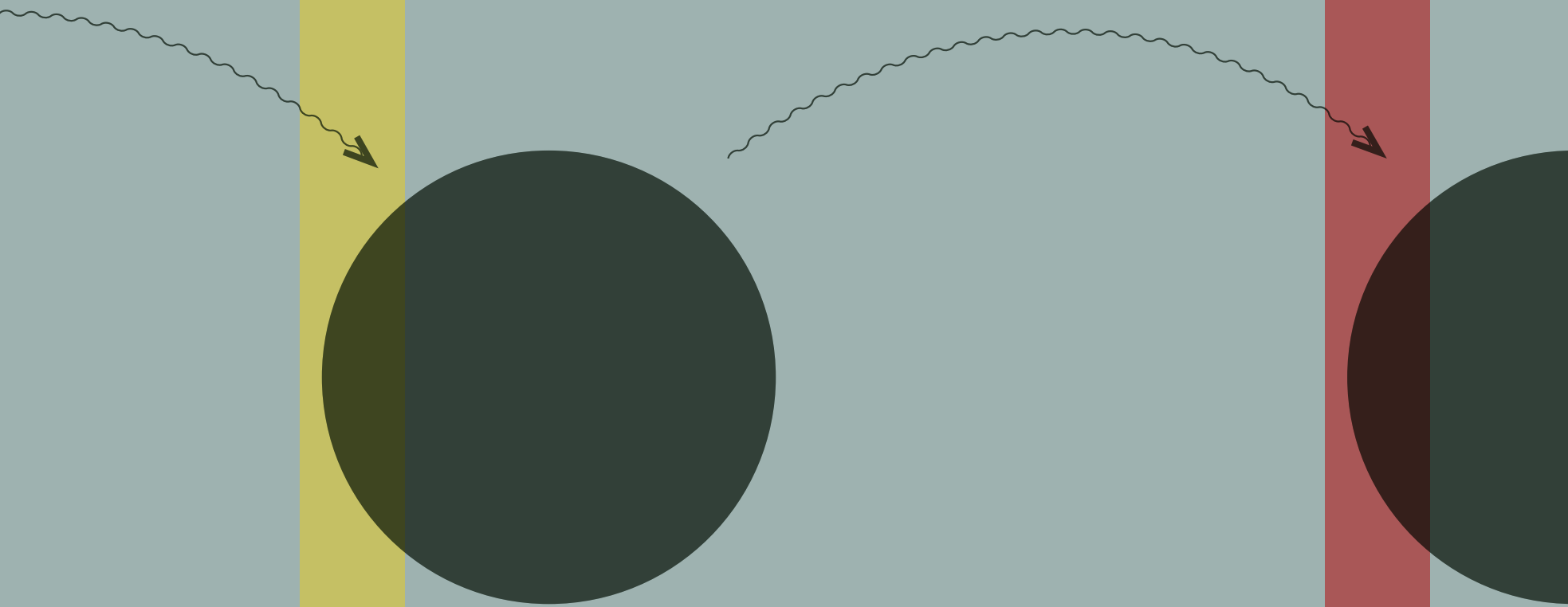
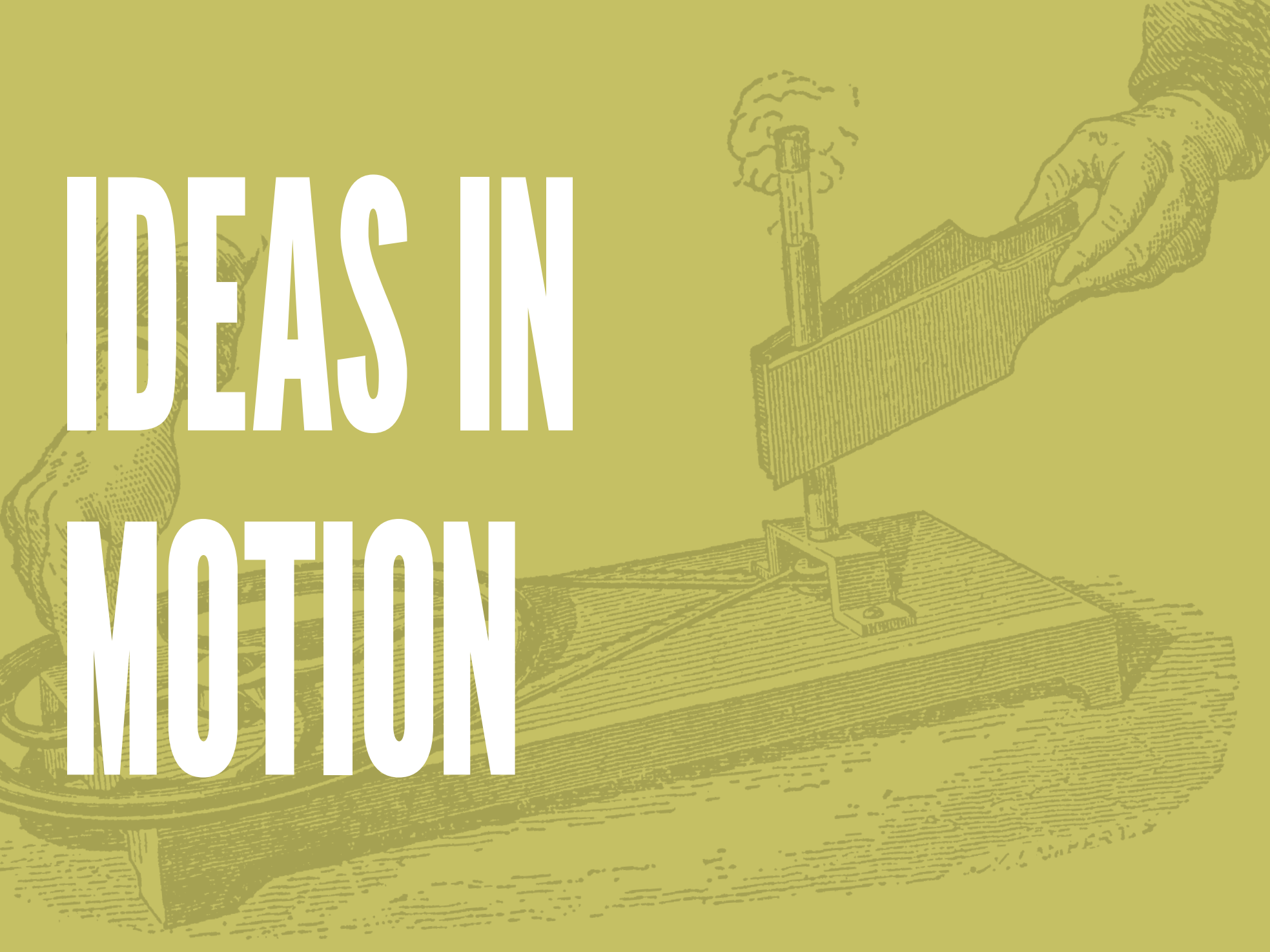
Motion& Interaction



IDEAS IN MOTION



DEFINITION:

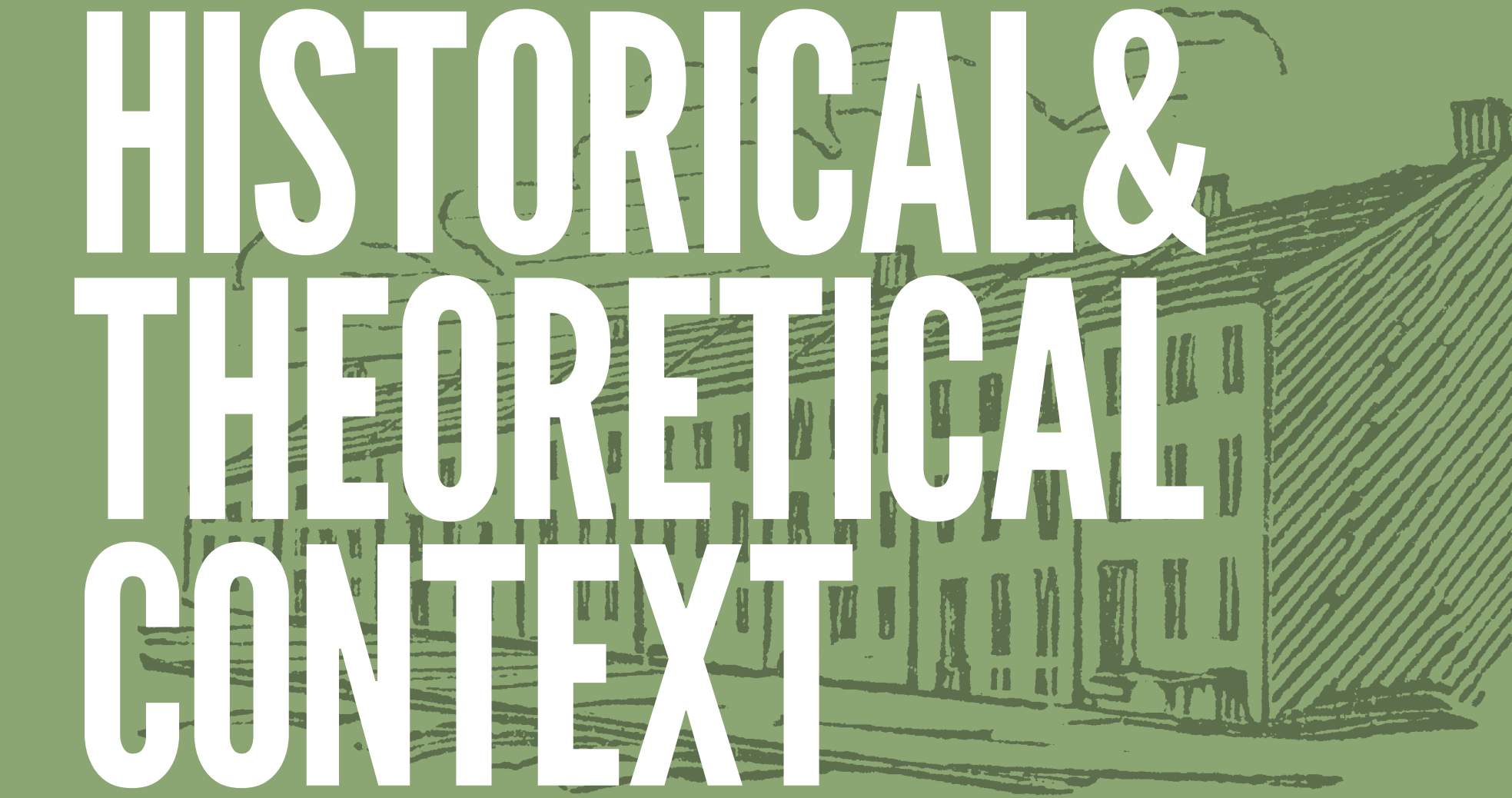
Motion:
a change in place or location over time …

* This is technically “velocity” in physics

DEFINITION:

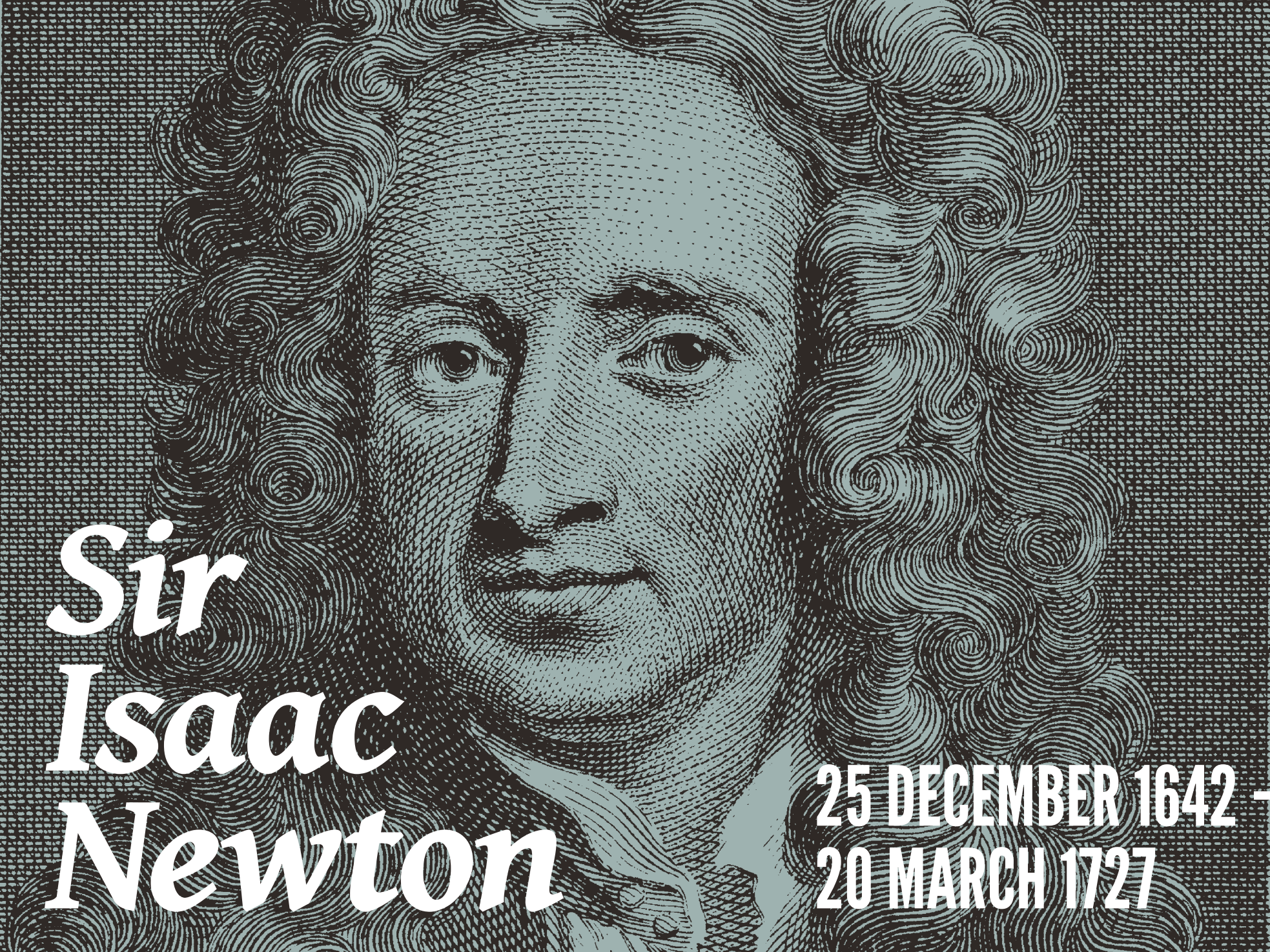
Motion:
change over time.

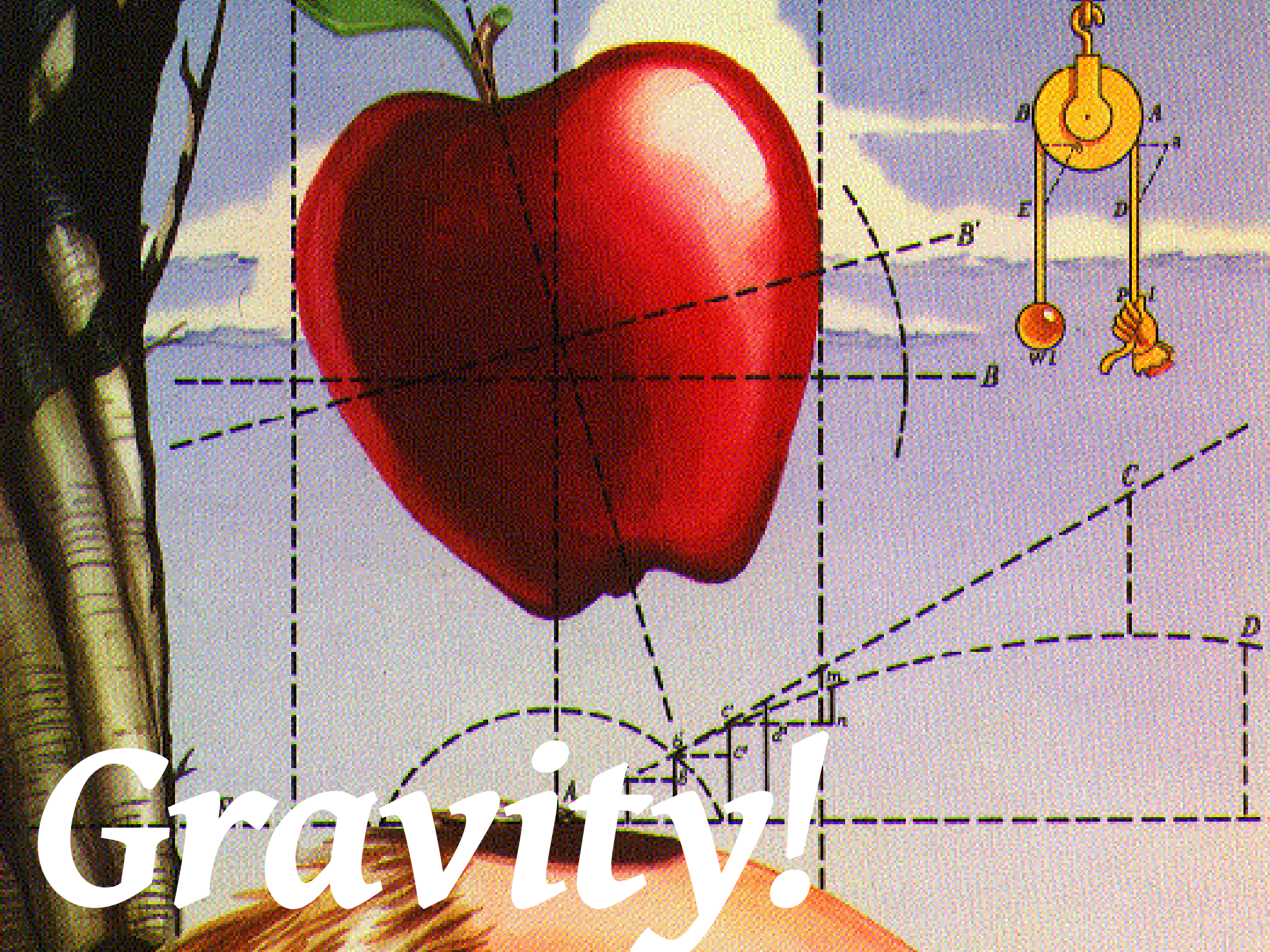
HISTORICAL & THEORETICAL CONTEXT



Newton

newtonian (or classical) mechanics


Sir
Isaac
Newton
25 DECEMBER 1642 –
20 MARCH 1727


B
A
E
D
B'
W.L
B
C
D
Gravity!

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

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

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

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

is the total distance traveled in 12 min.

$dt = \int_0^2 v(t)dt - \int_2^4 v(t)dt + \int_4^{12} v(t)dt$

$= .2 + .2 + 1.4 = 1.8 \text{ miles}$

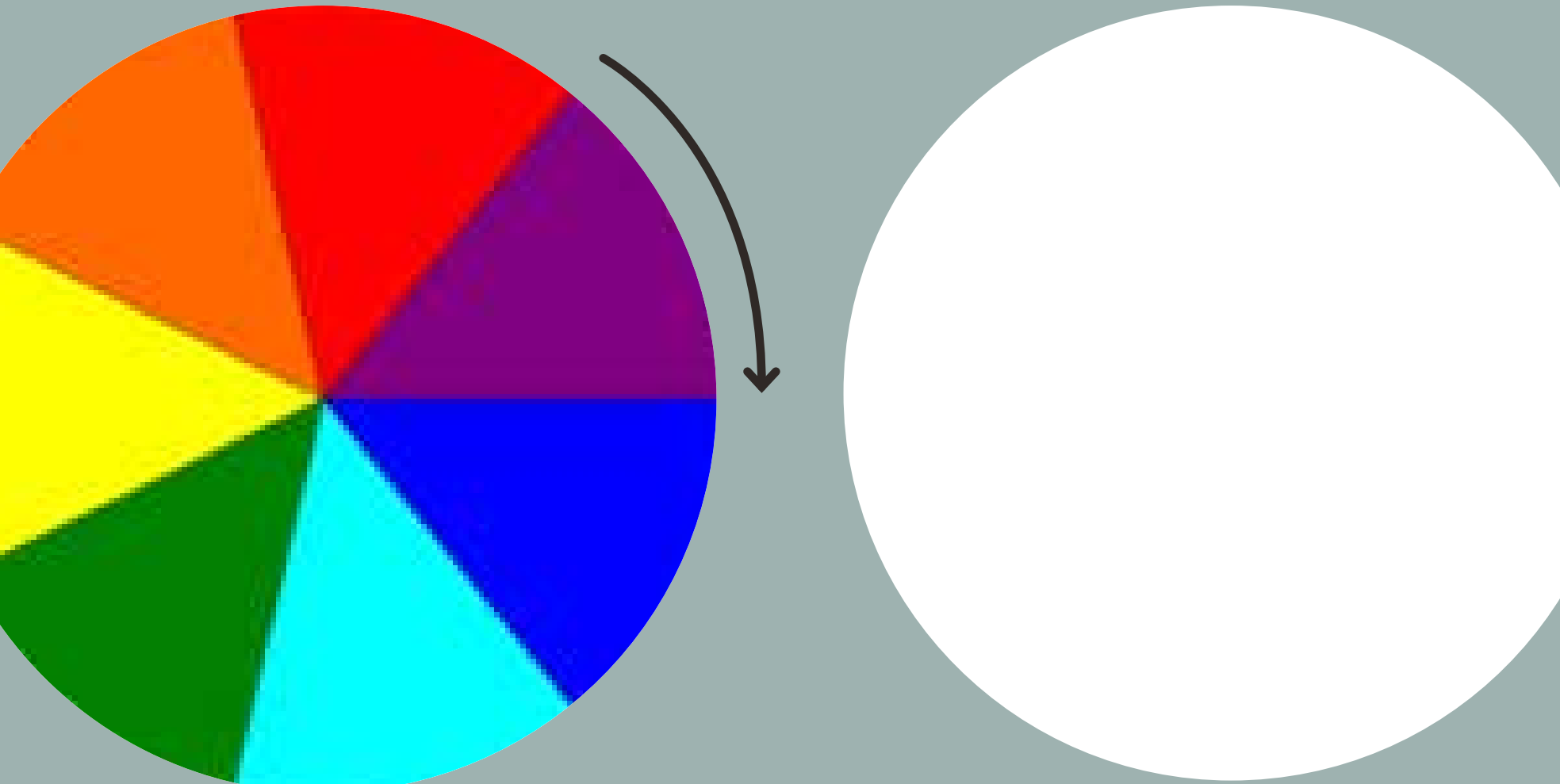
Calculus!

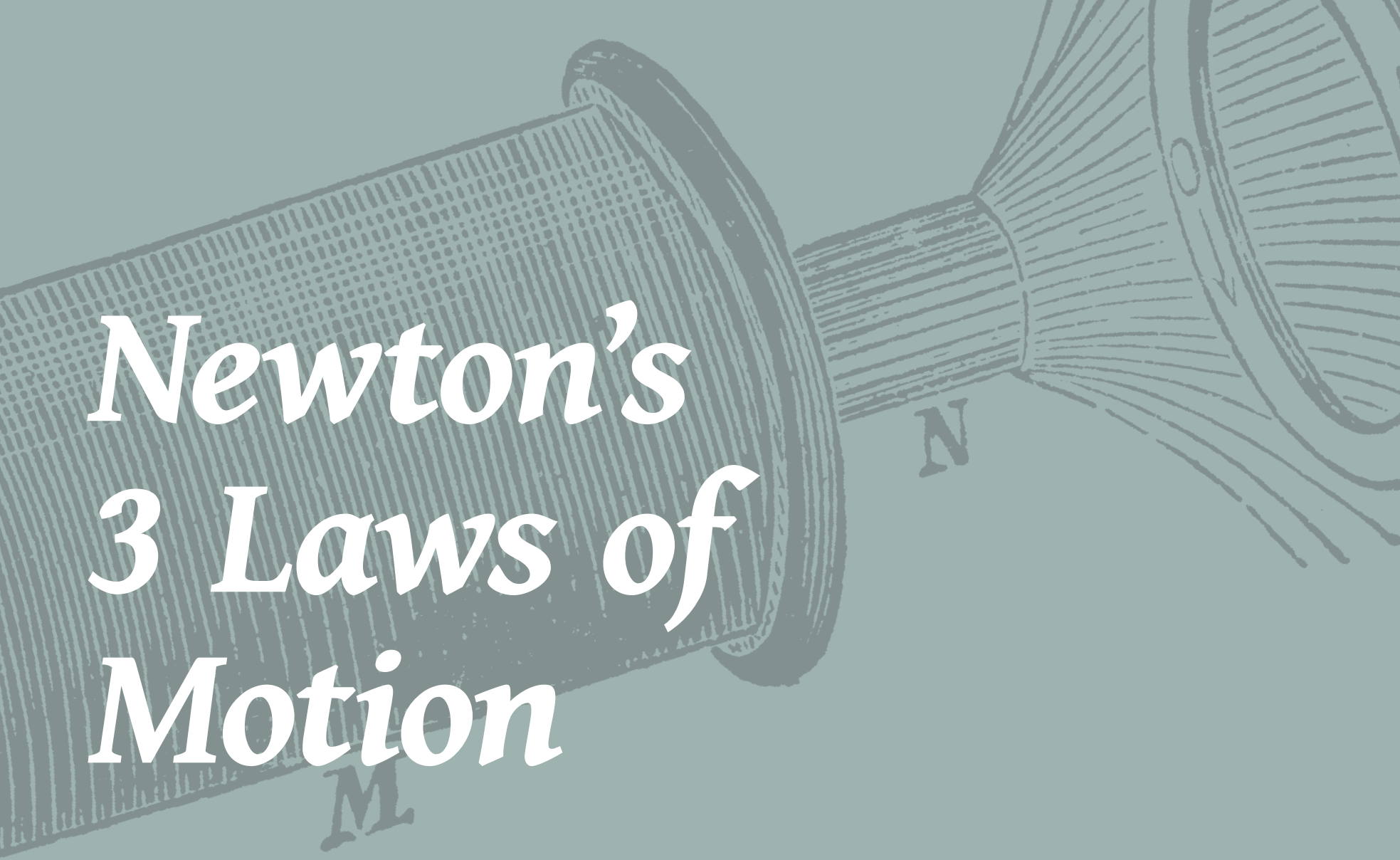
Newton Disc

PERSISTANCE OF VISION

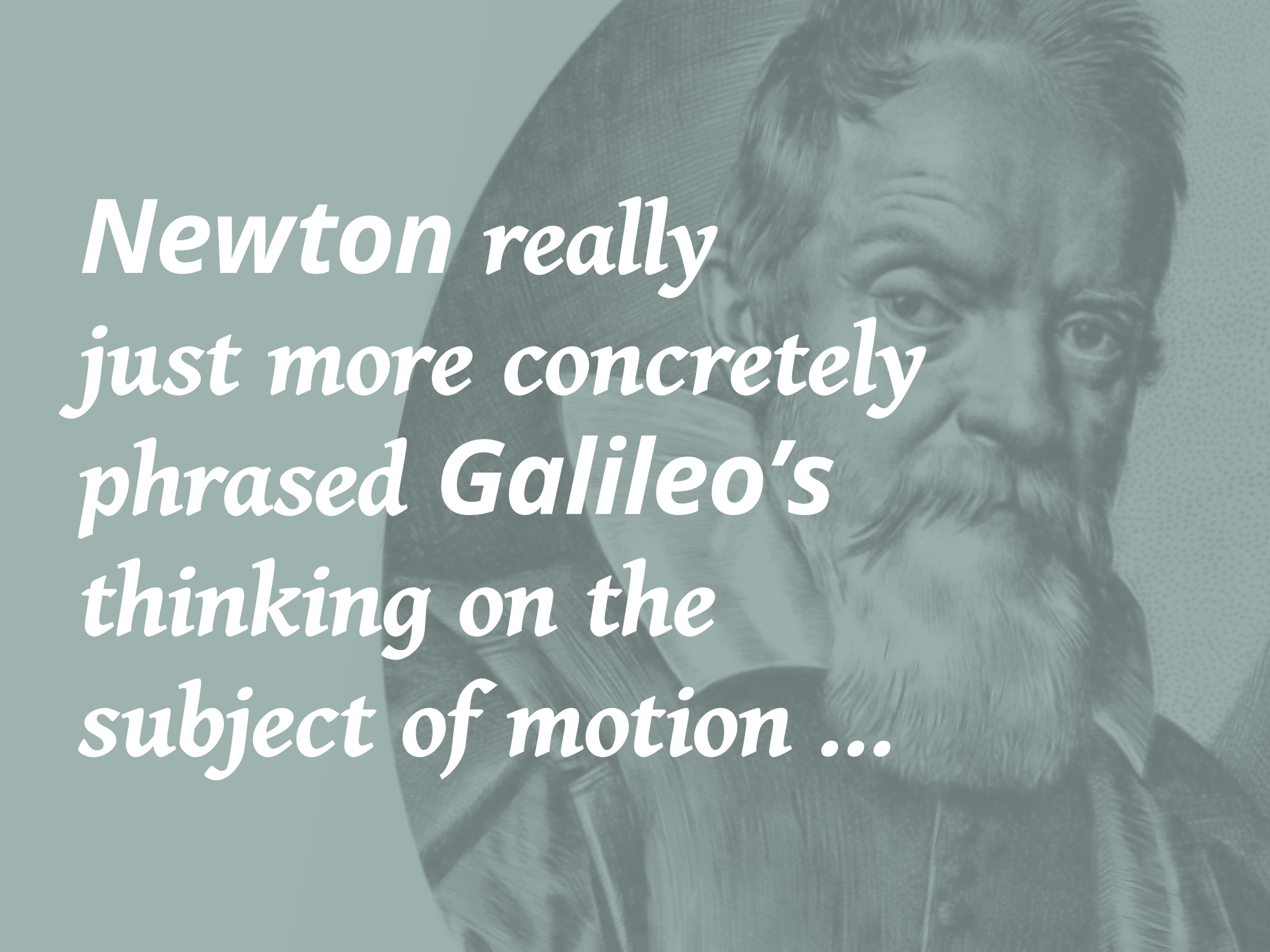
SIDENOTE!

Persistance of Vision

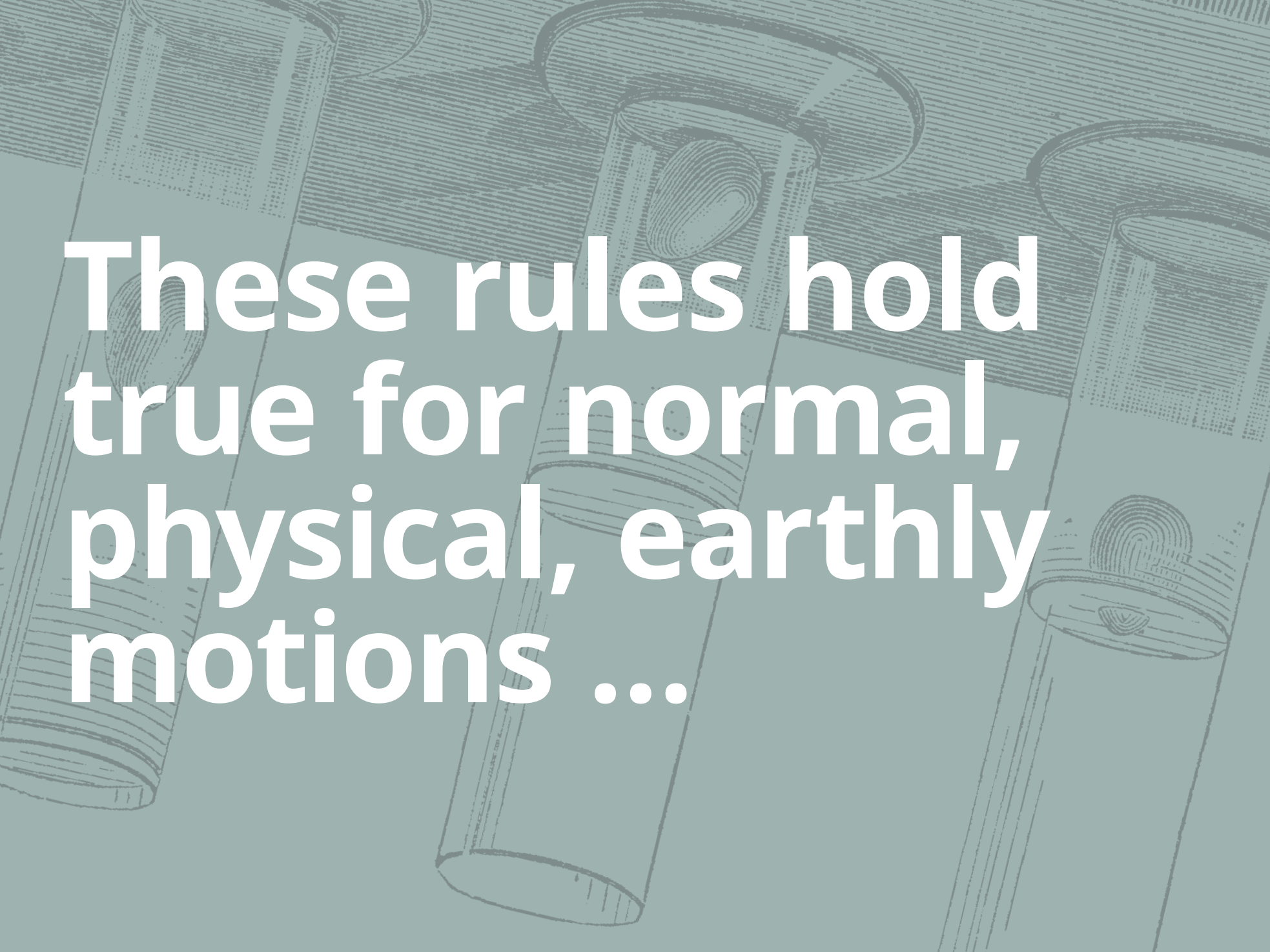




Newton's 3 Laws of Motion



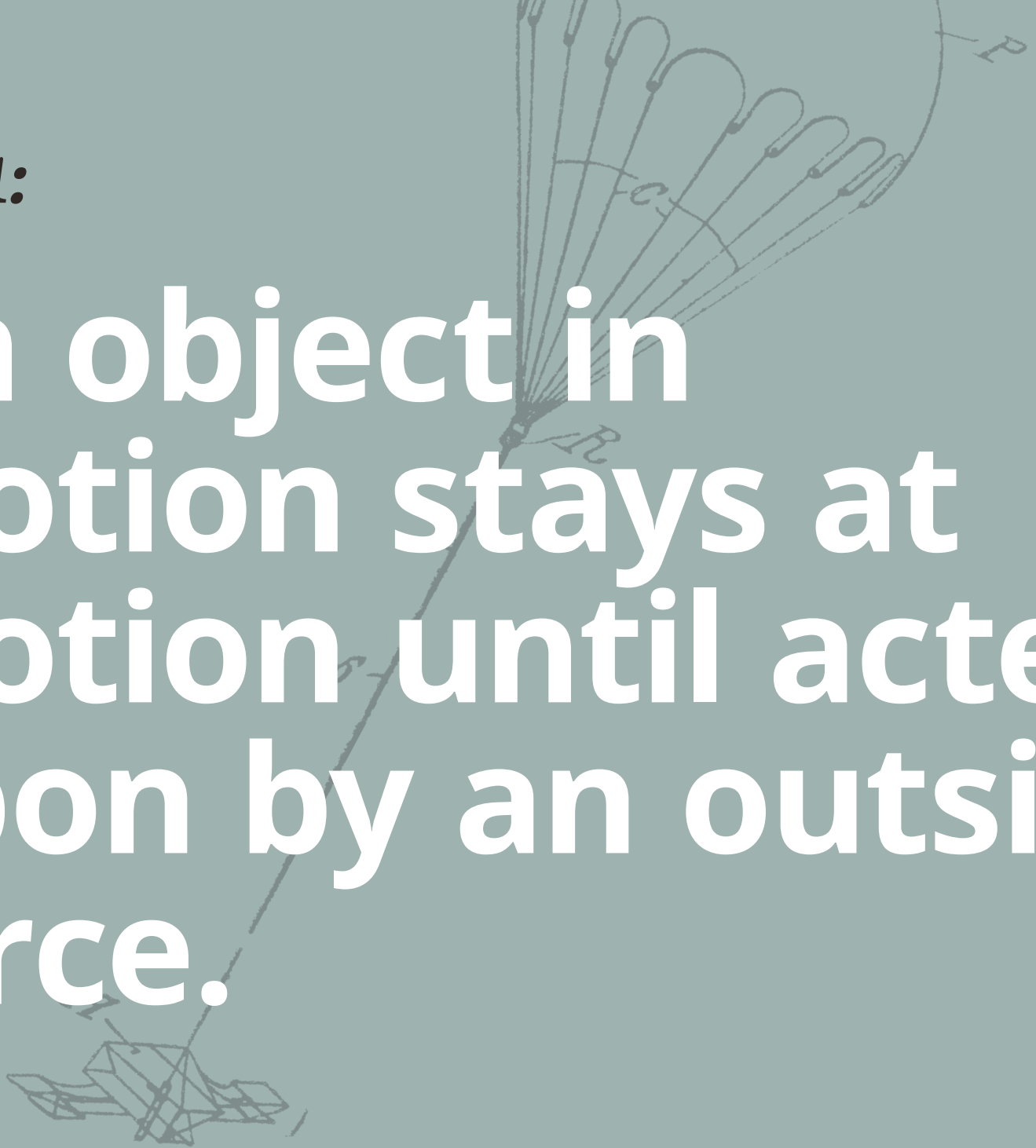
Newton really just more concretely phrased Galileo's thinking on the subject of motion ...



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

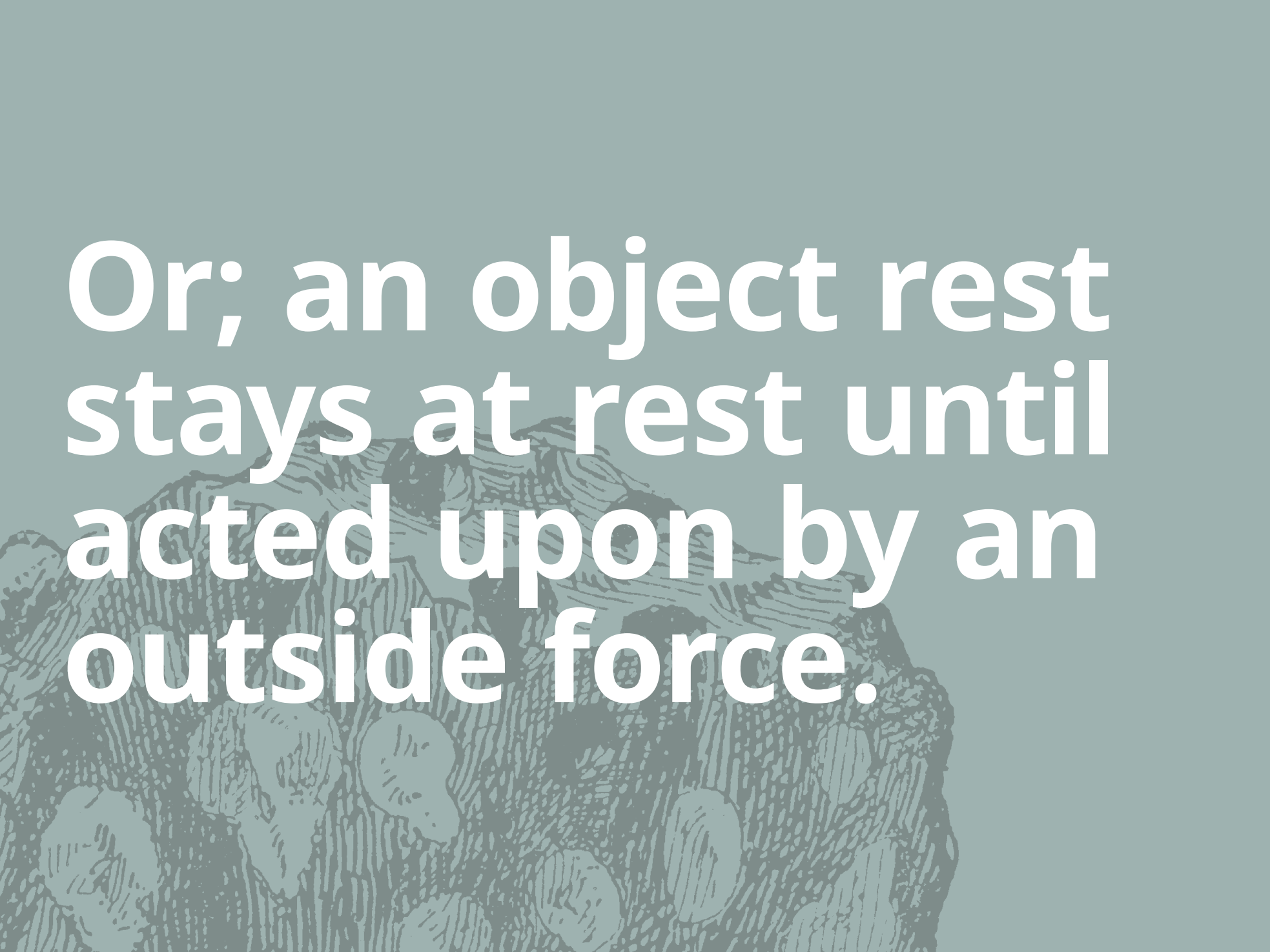

USA


15

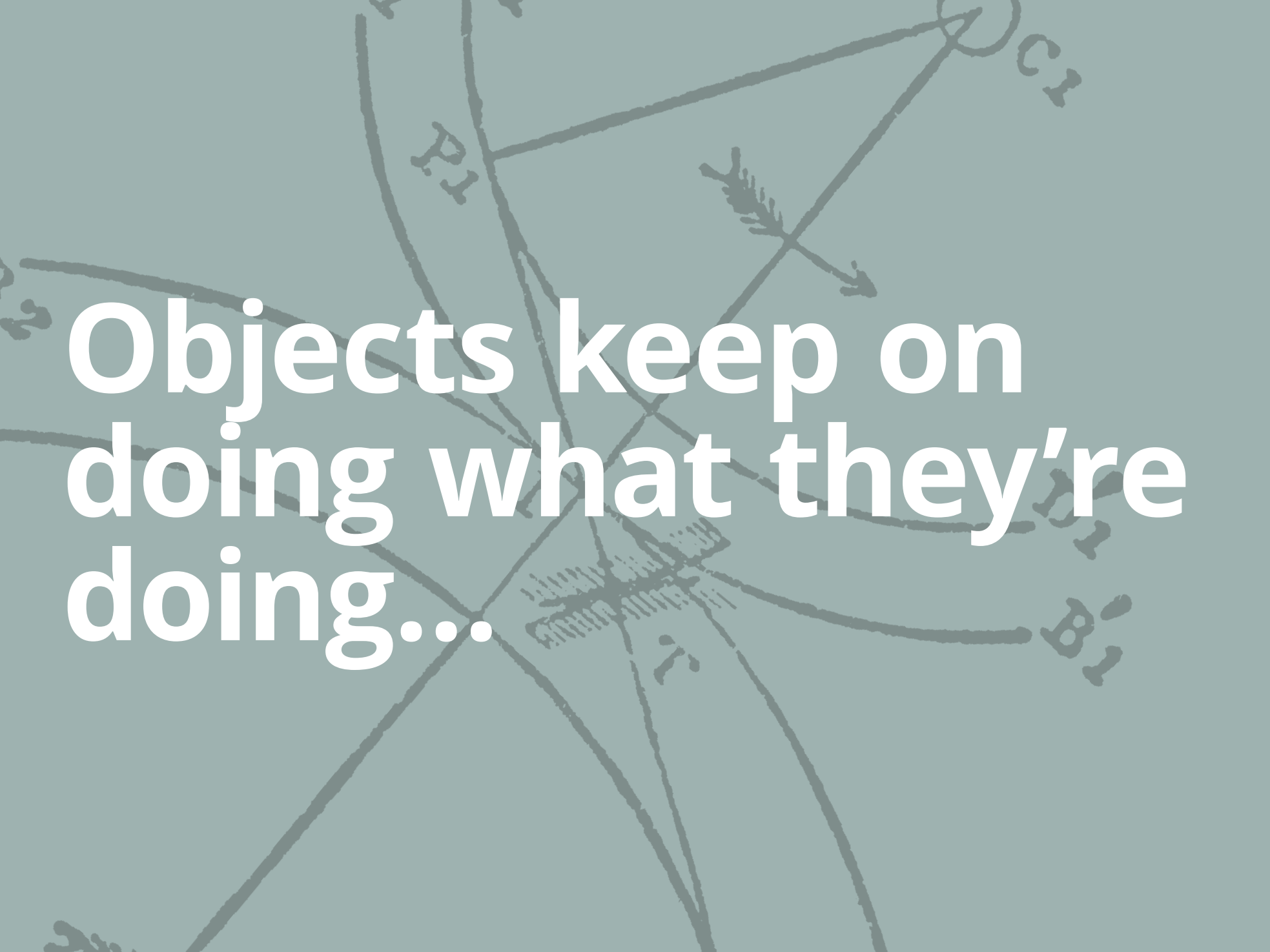


LAW 1:

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



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

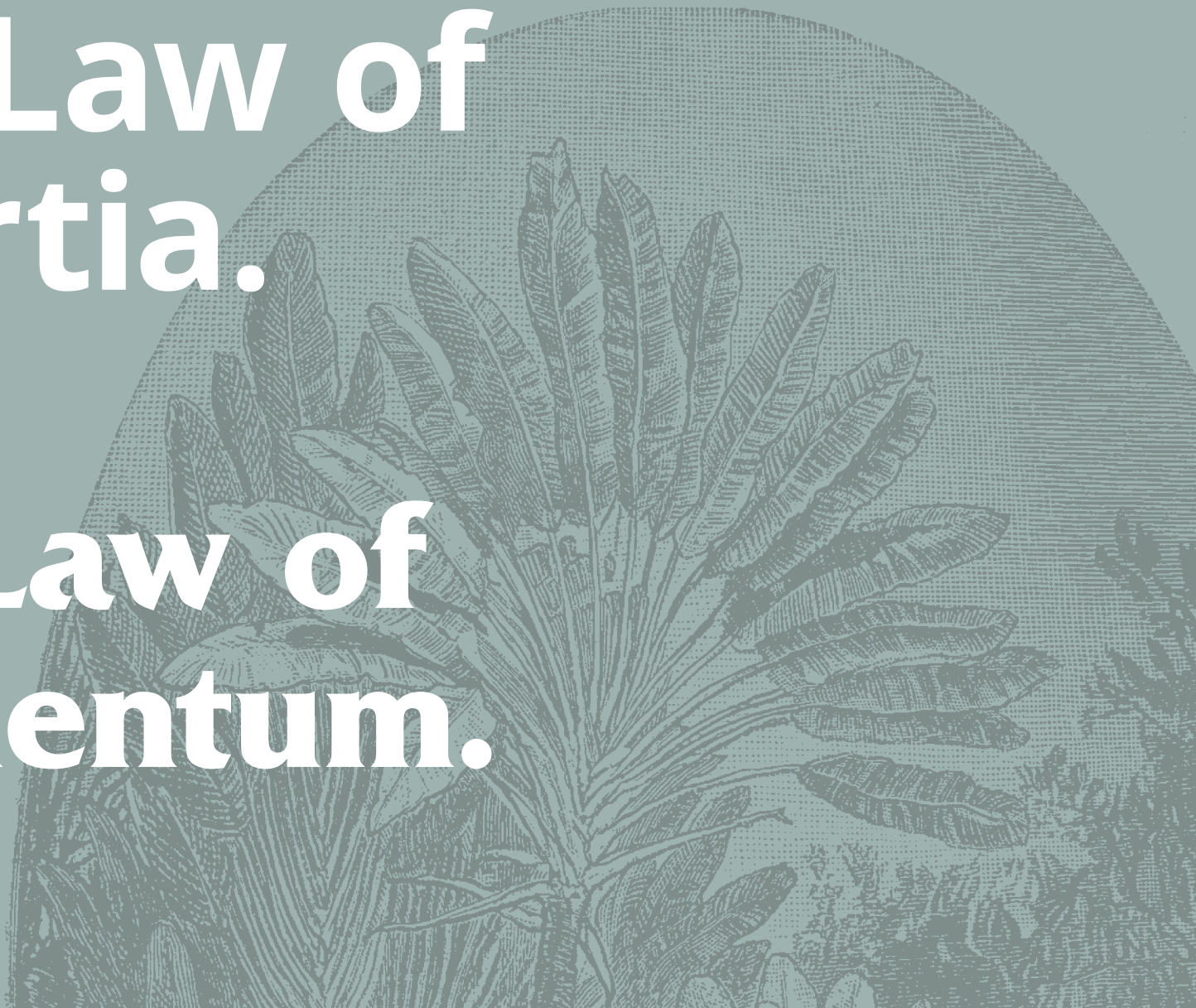


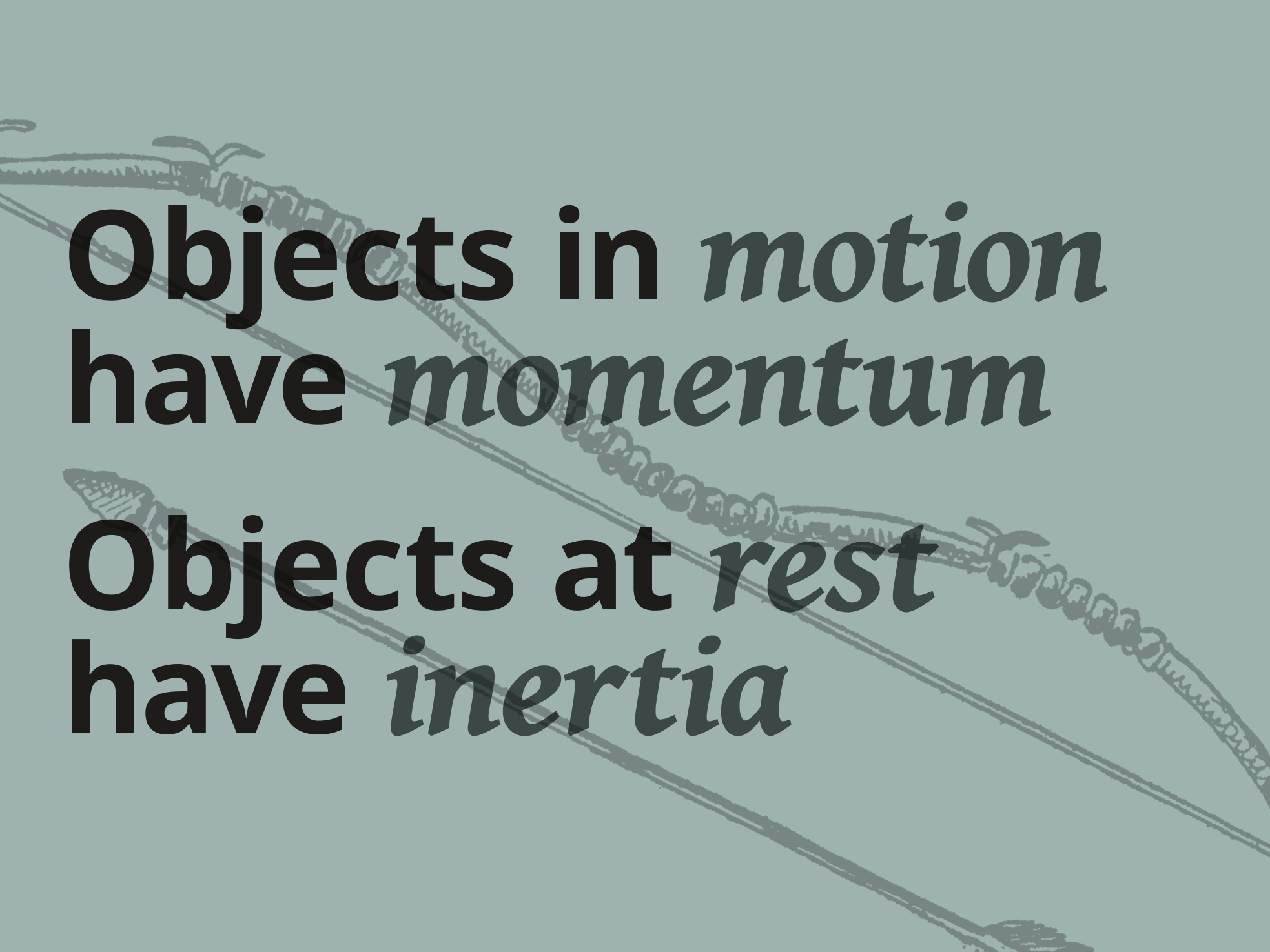
Objects keep on doing what they're doing...

The Law of Intertia.

or

The Law of Momentum.




Objects in *motion*
have *momentum*
Objects at *rest*
have *inertia*


050


Corona

LAW 2:

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

$$F = ma$$

F = force
m = mass
a = acceleration

Heavier objects require more force to accelerate the same as lighter objects

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

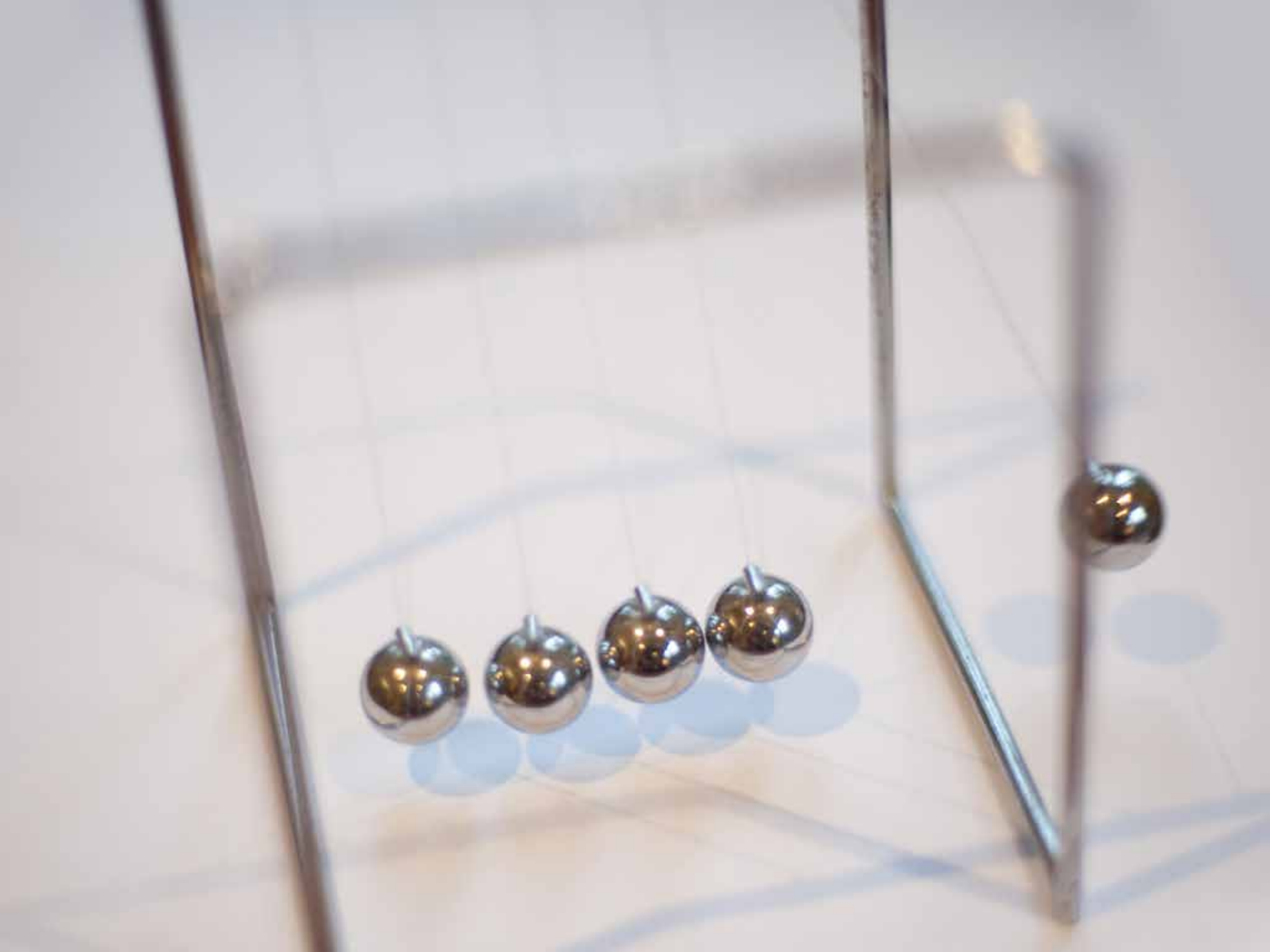

USA

LAW 3:

For every action there is an equal and opposite reaction.

When you push an object it pushes back with equal force.


USA

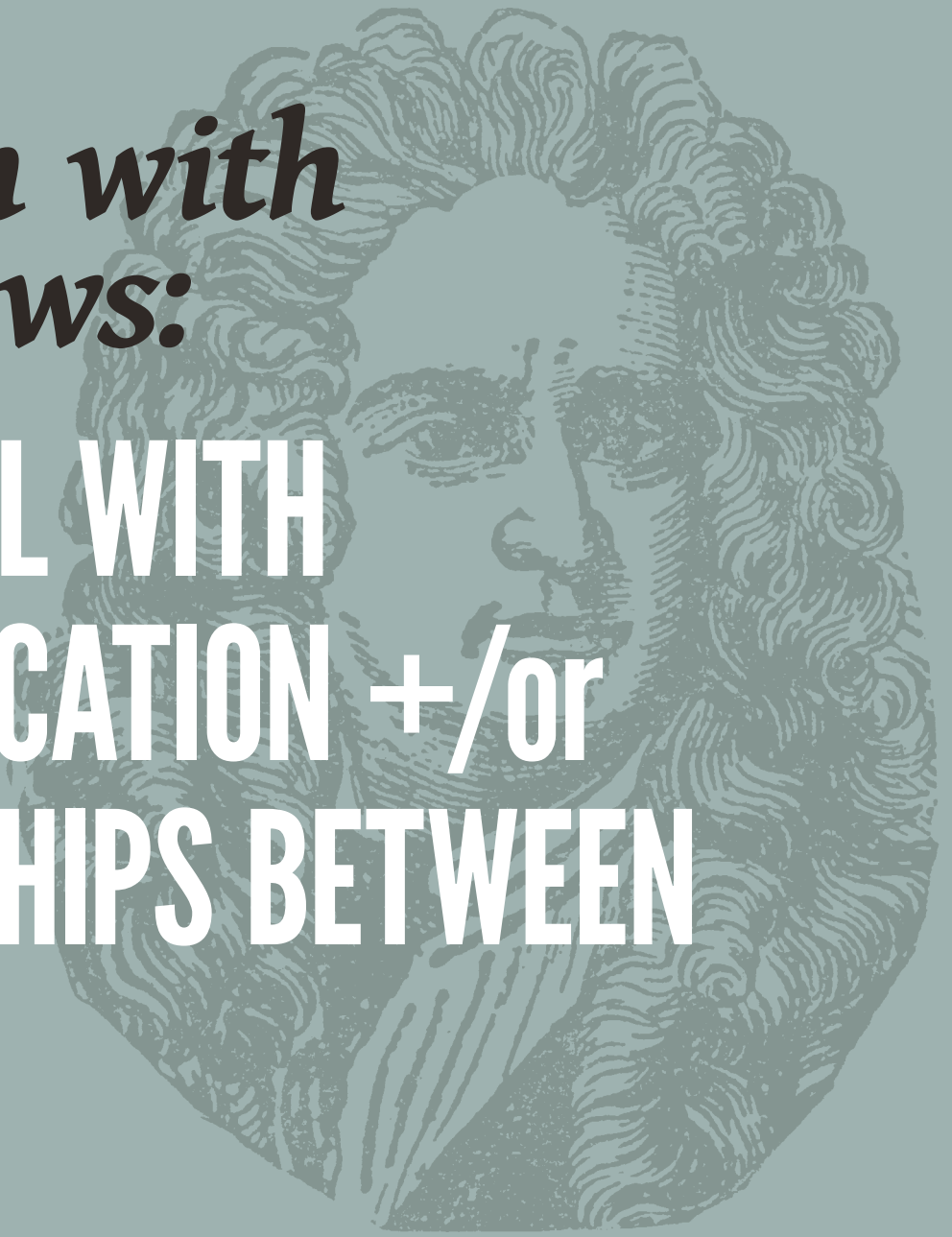


Why You Should Care:

REALISTIC, (OR INTENTIONALLY UNREALISTIC) REPRESENTATION OF MOTIONS...

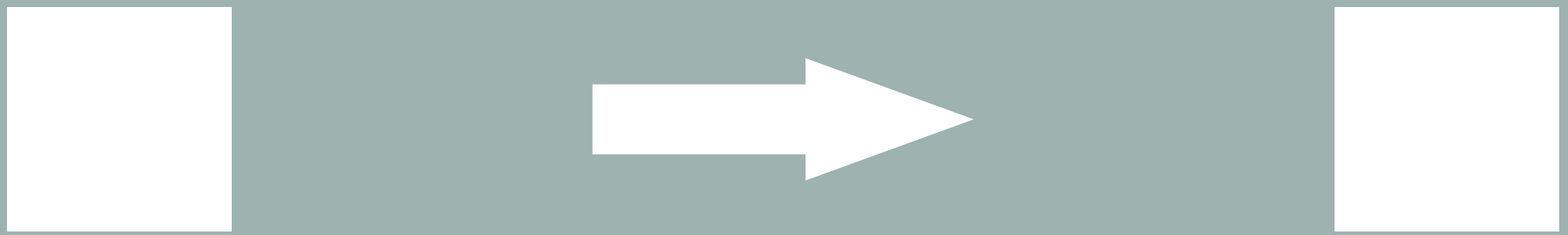
The problem with Newton's Laws:

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



Newton gives us

CHANGE IN POSITION



DEFINITION:

Motion:
a change in place or location over time …

* This is technically “velocity” in physics

does anybody have any

QUESTIONS?


for ideas more relevant
TO DESIGN,
we need to go a little farther back ...

ARISTOTLE

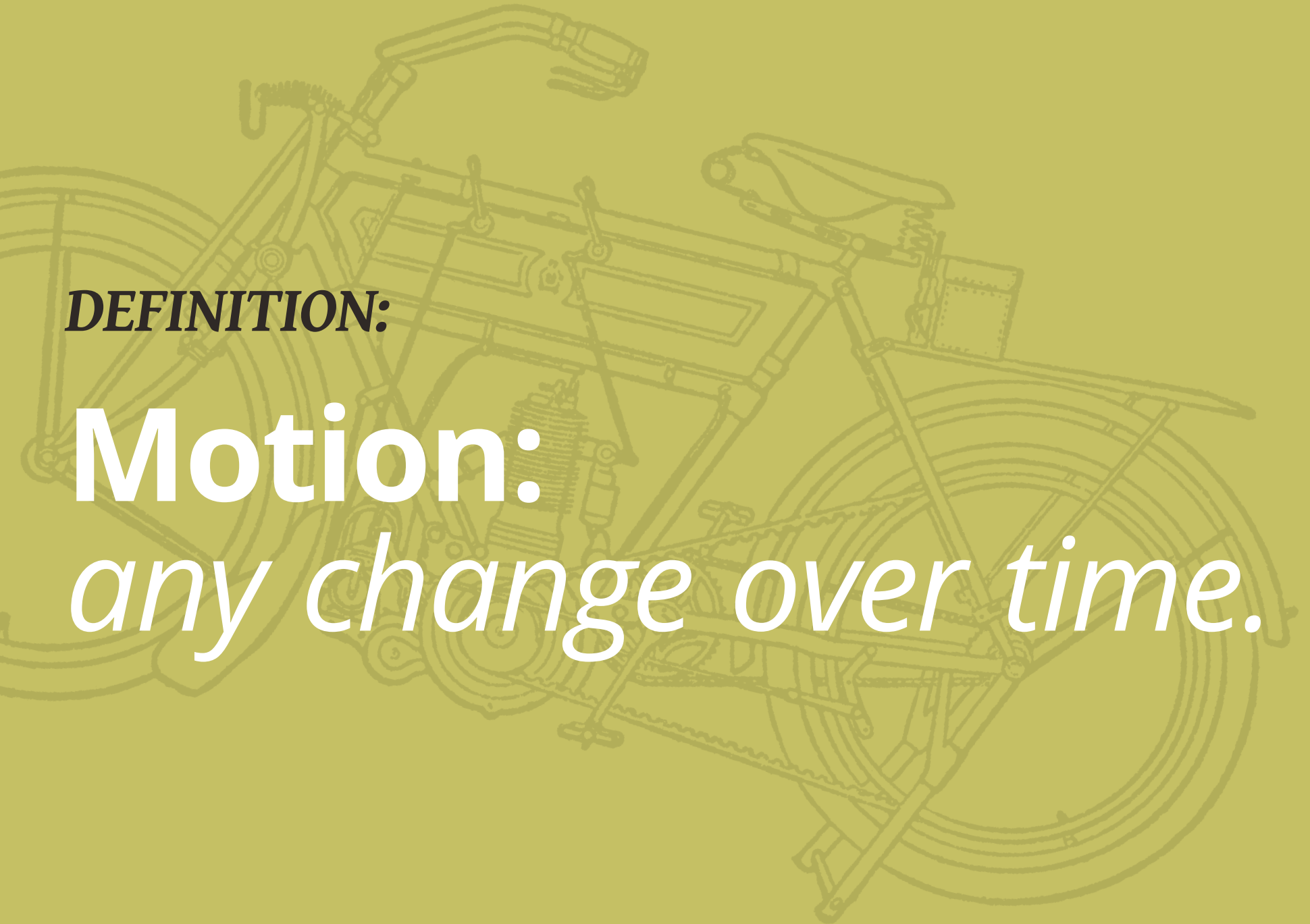
384 BC – 322 BC

Aristotle used the term

"MOTION"

to describe any kind of

CHANGE



DEFINITION:

Motion:

any change over time.


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


ARTIFICAL
caused by man
VS
NATURAL
caused by nature

artificial motions are aka

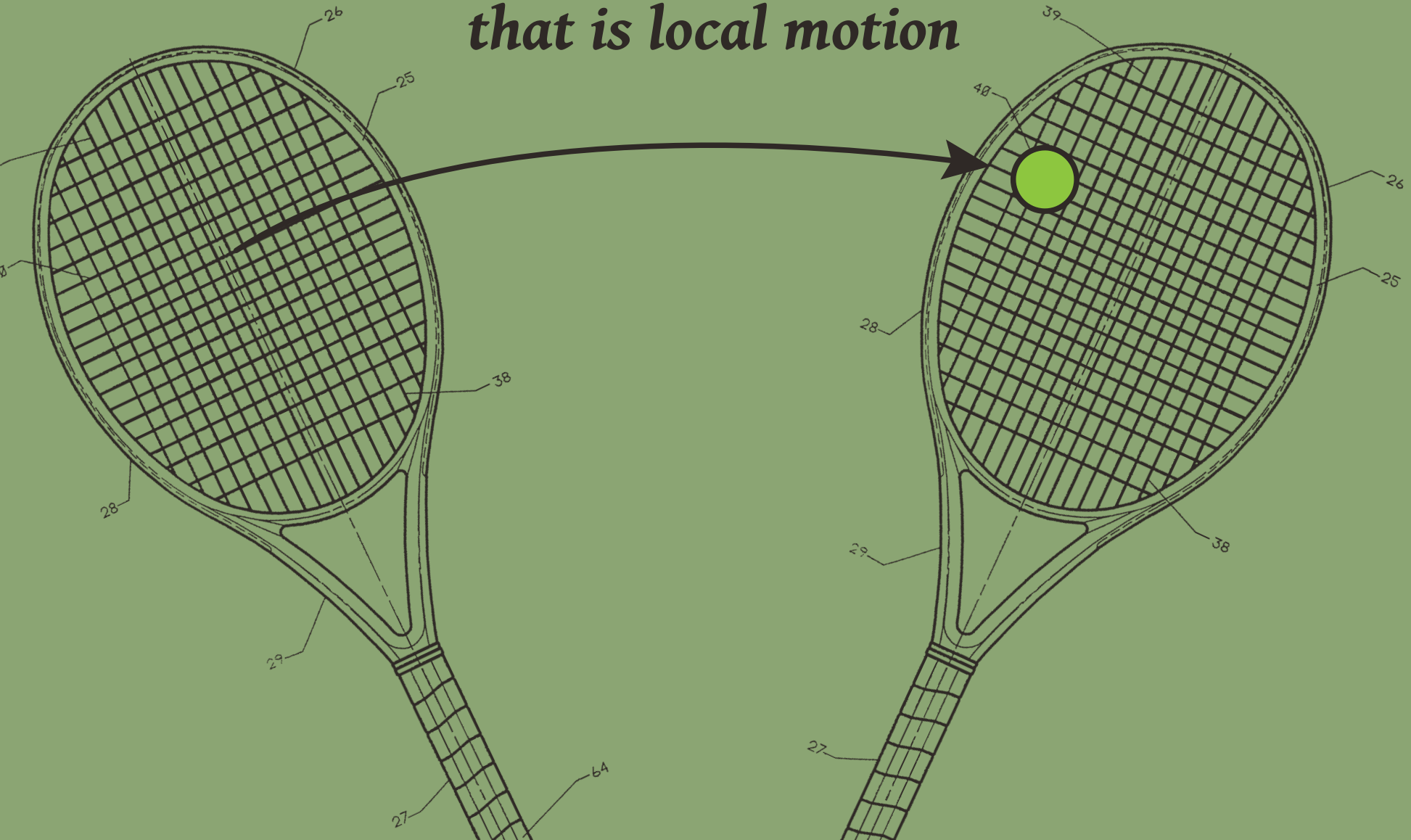
VIOLENT MOTIONS

violent in that they violate natural tendencies of objects

1. LOCAL MOTION

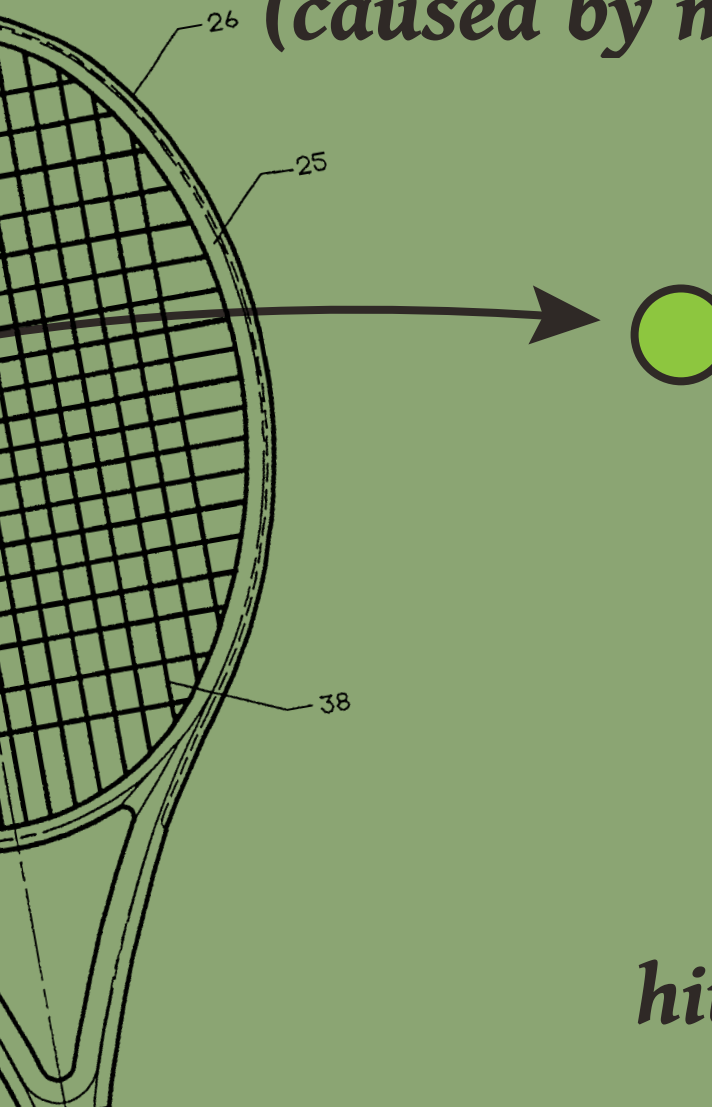
a change in place

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



ARTIFICIAL *vs.* NATURAL

(caused by man) *(caused by nature)*

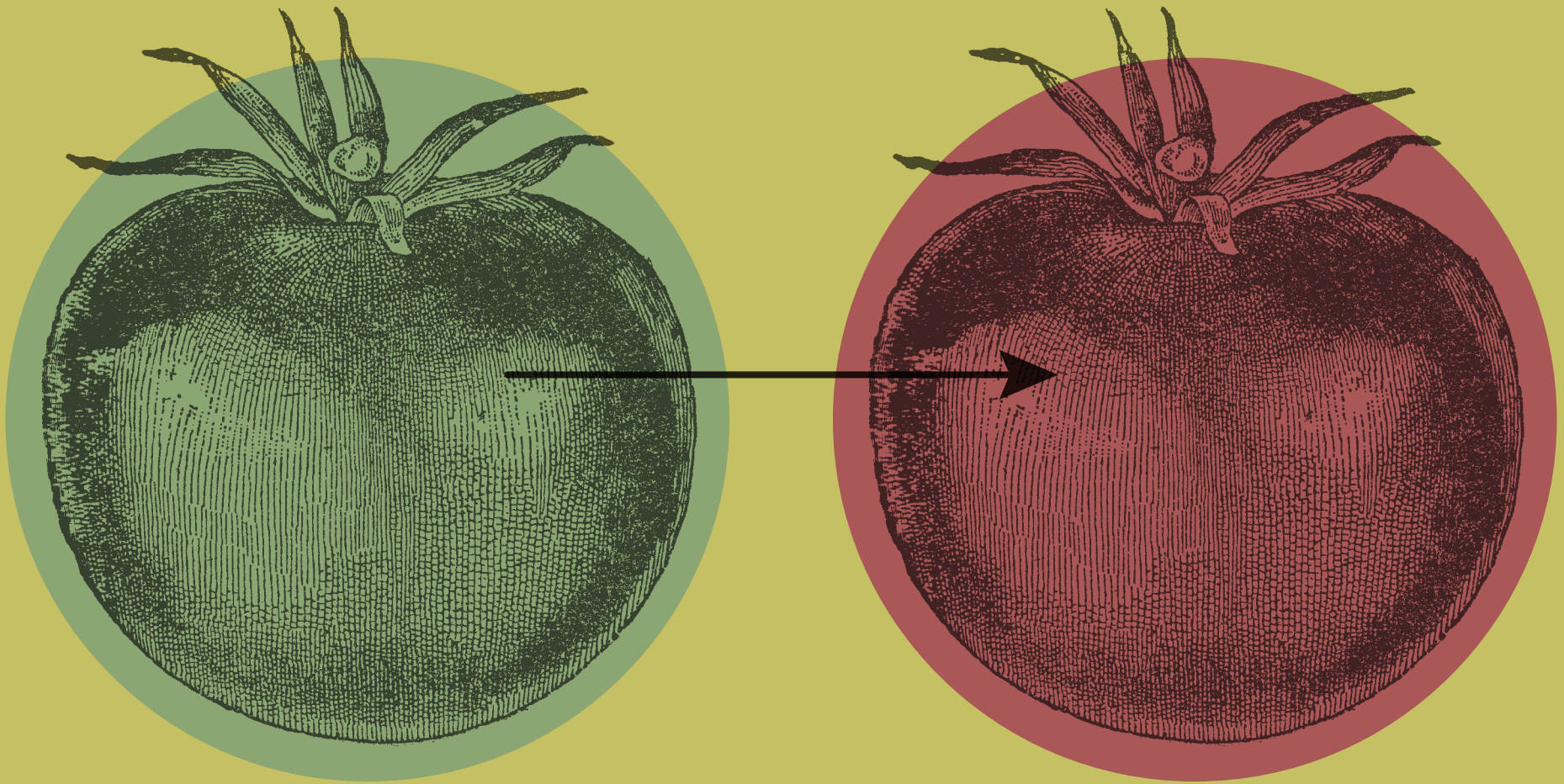


hitting vs. dropping

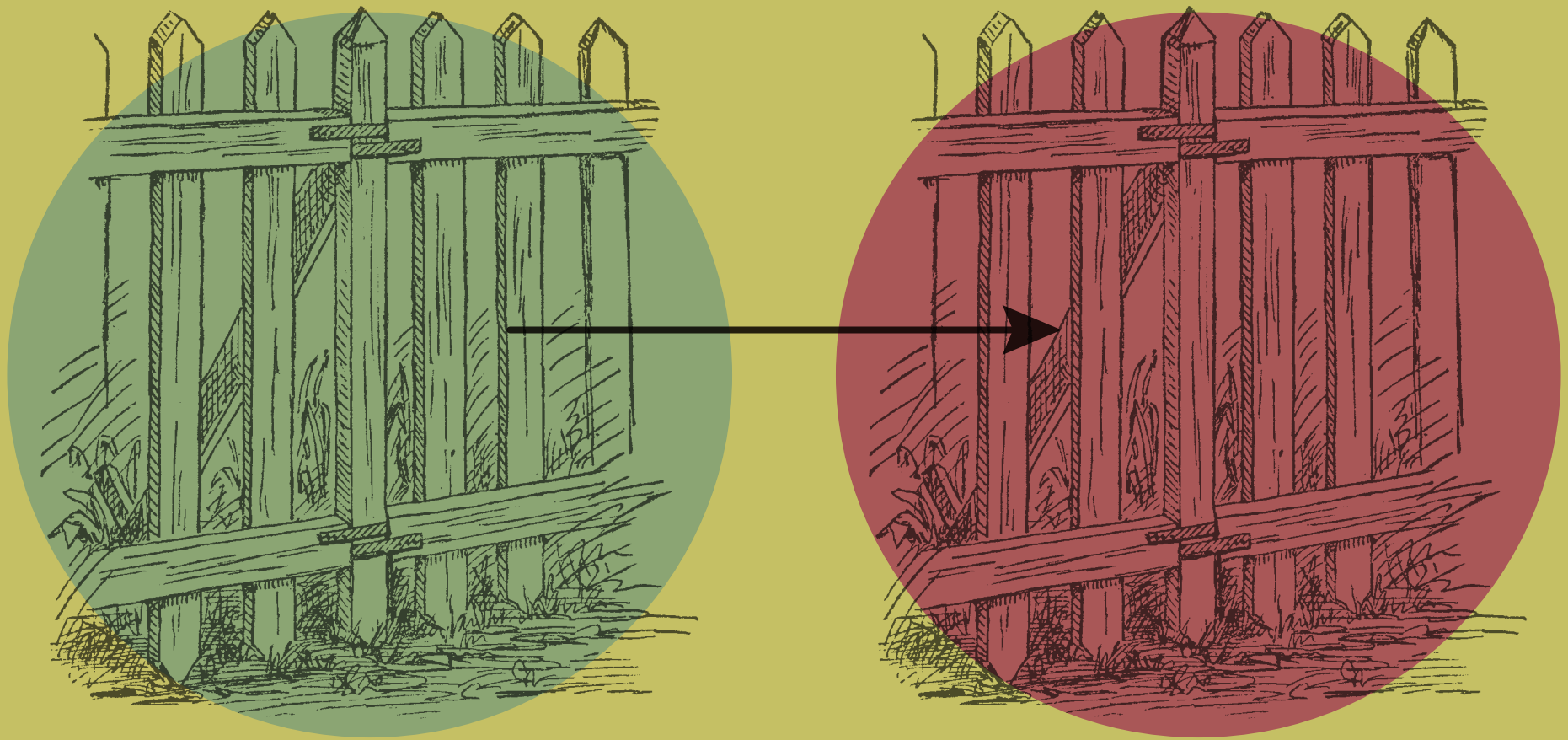
2. ALTERATION

alterations of attributes;
a change in quality

natural



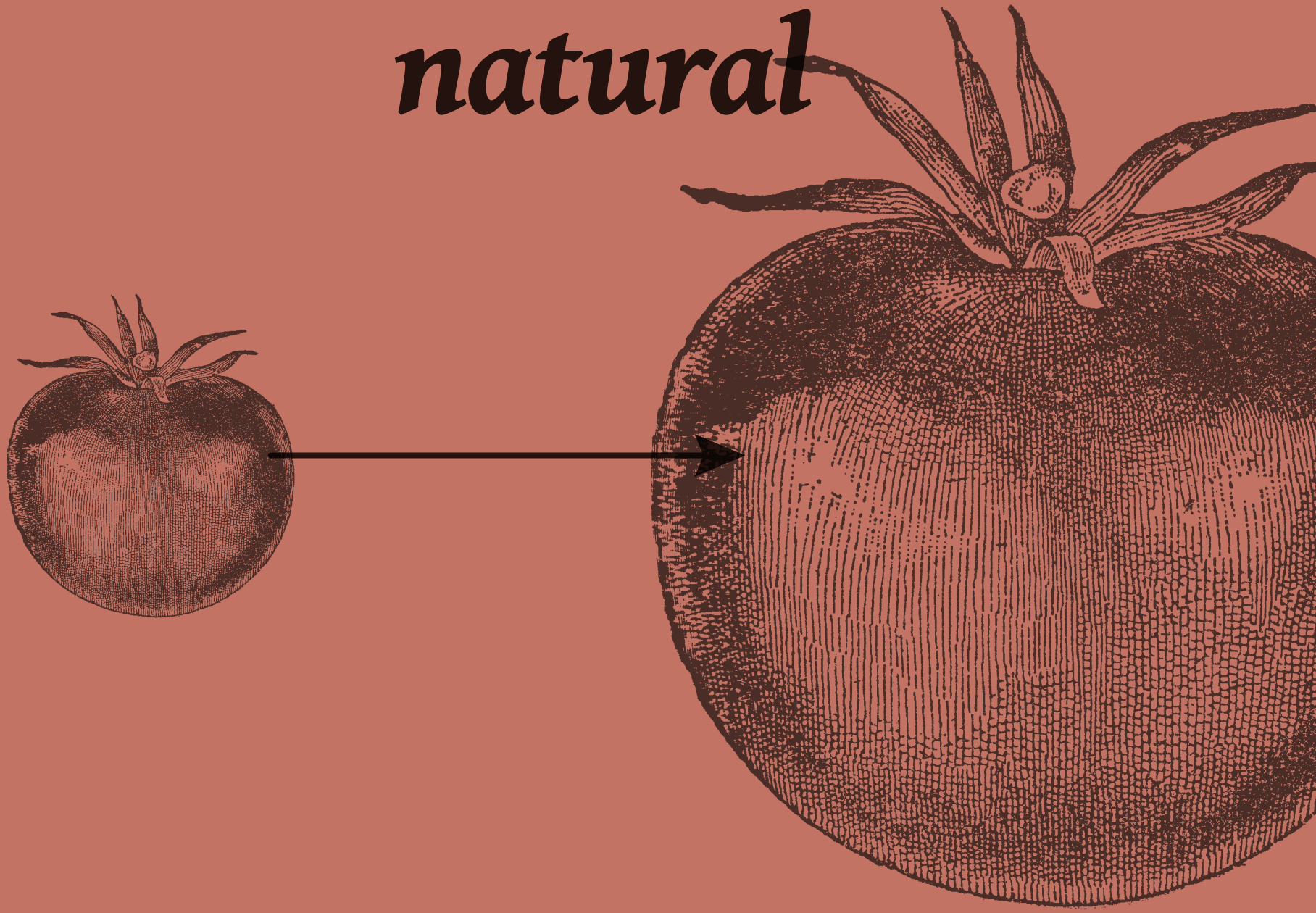
artificial



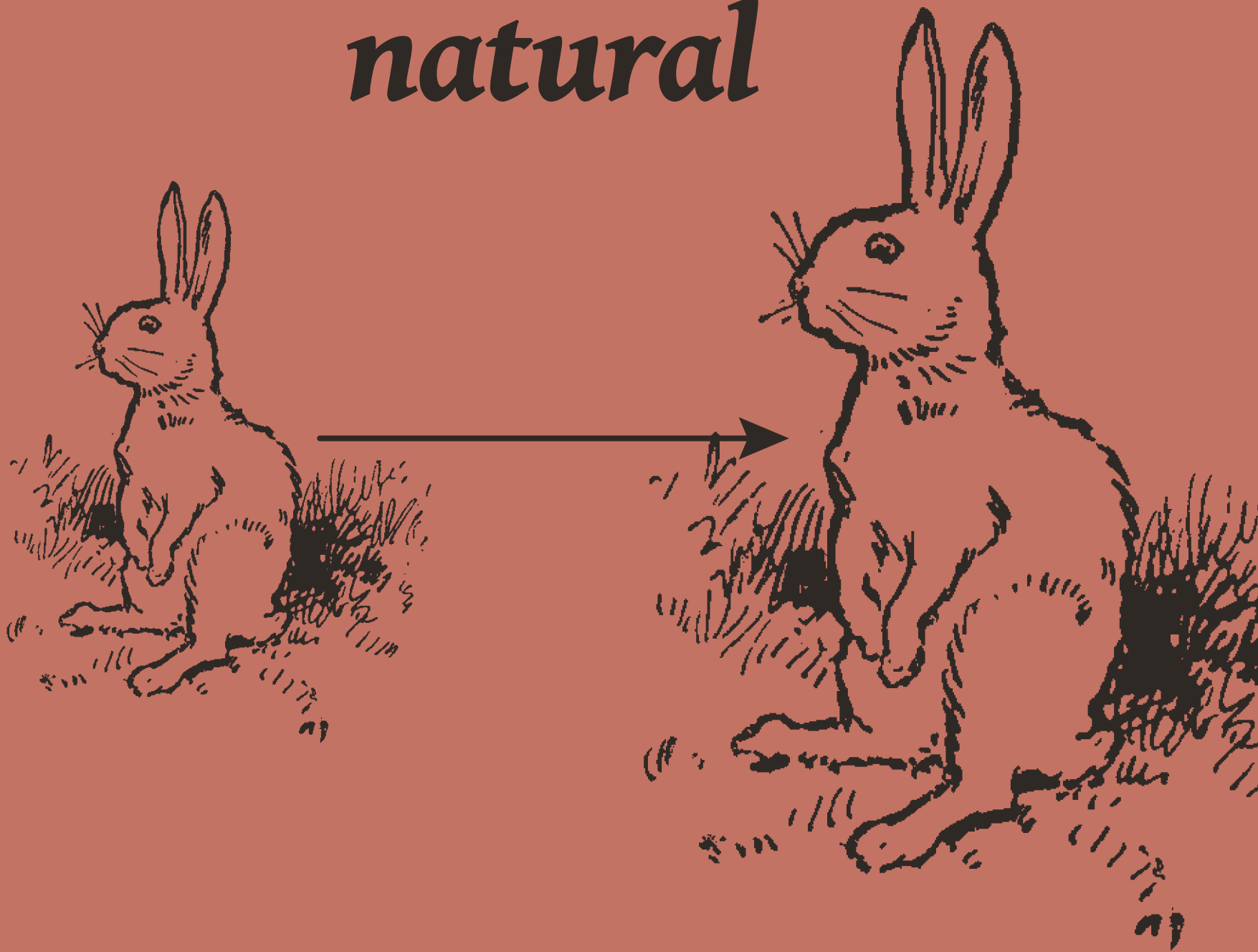
3. GROWTH

a change in quantity

natural

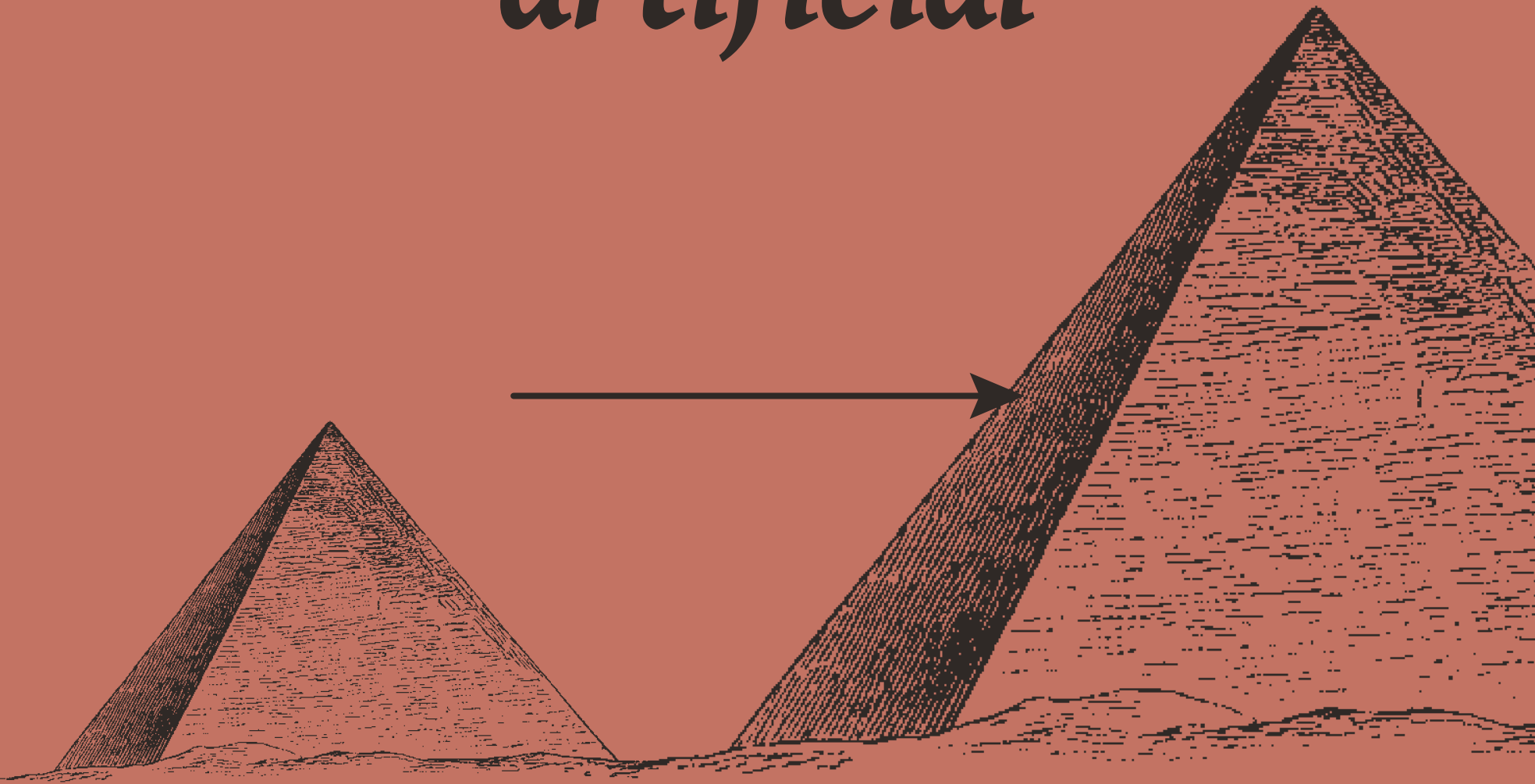


natural



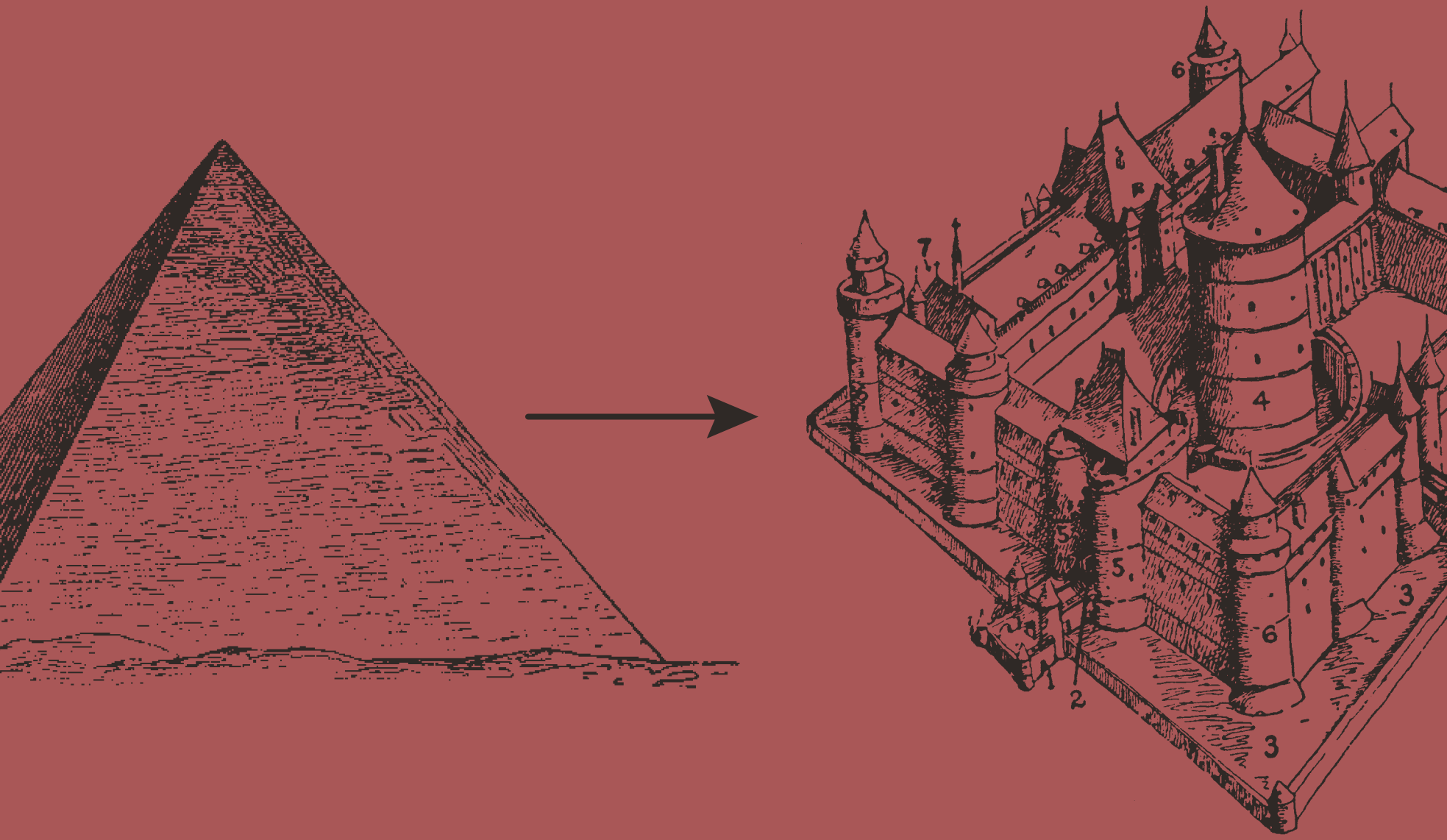
natural

artificial



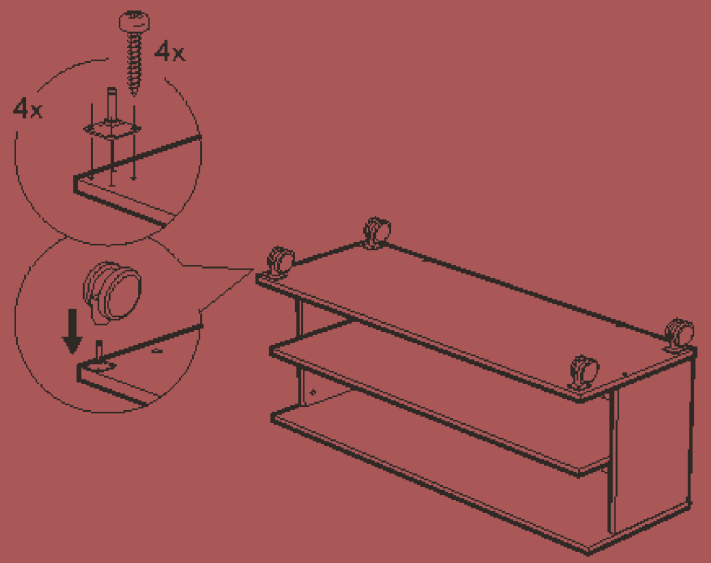
4. COMING TO BE & PASSING AWAY

a change in substance

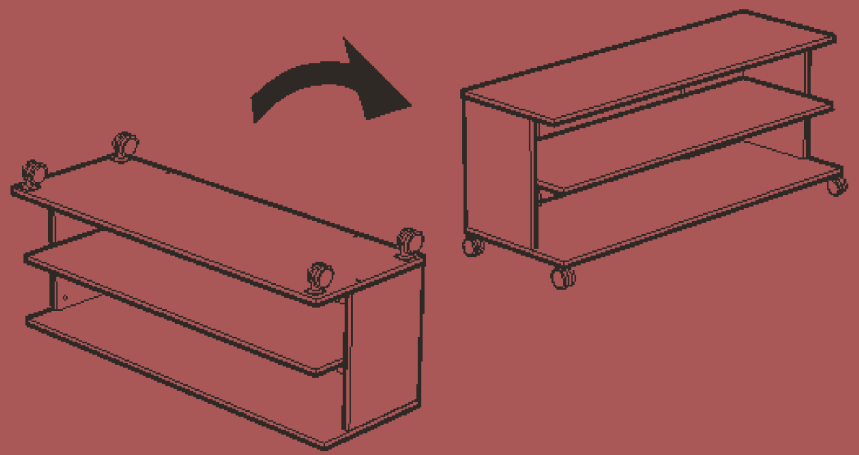

6
7
4
5
3
6
2
3

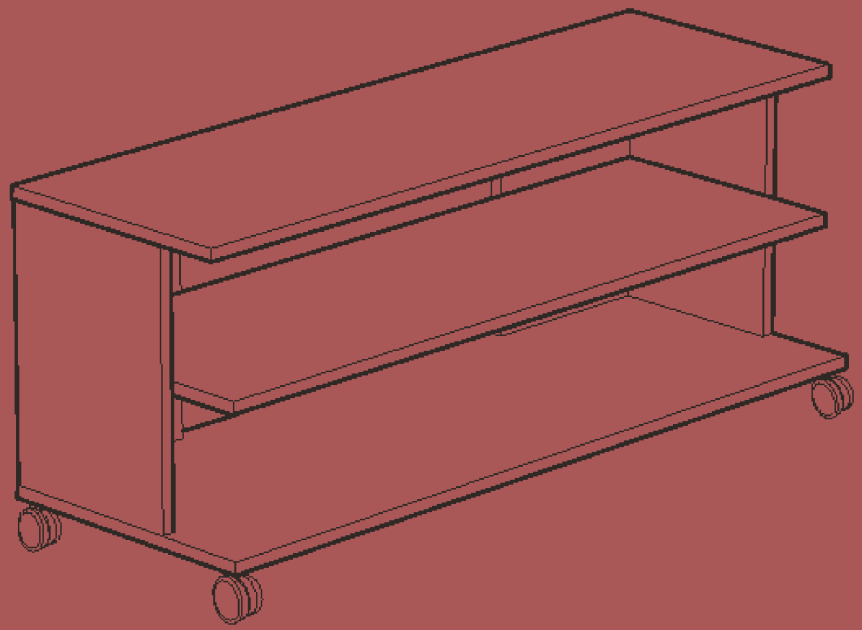
BENNO

10



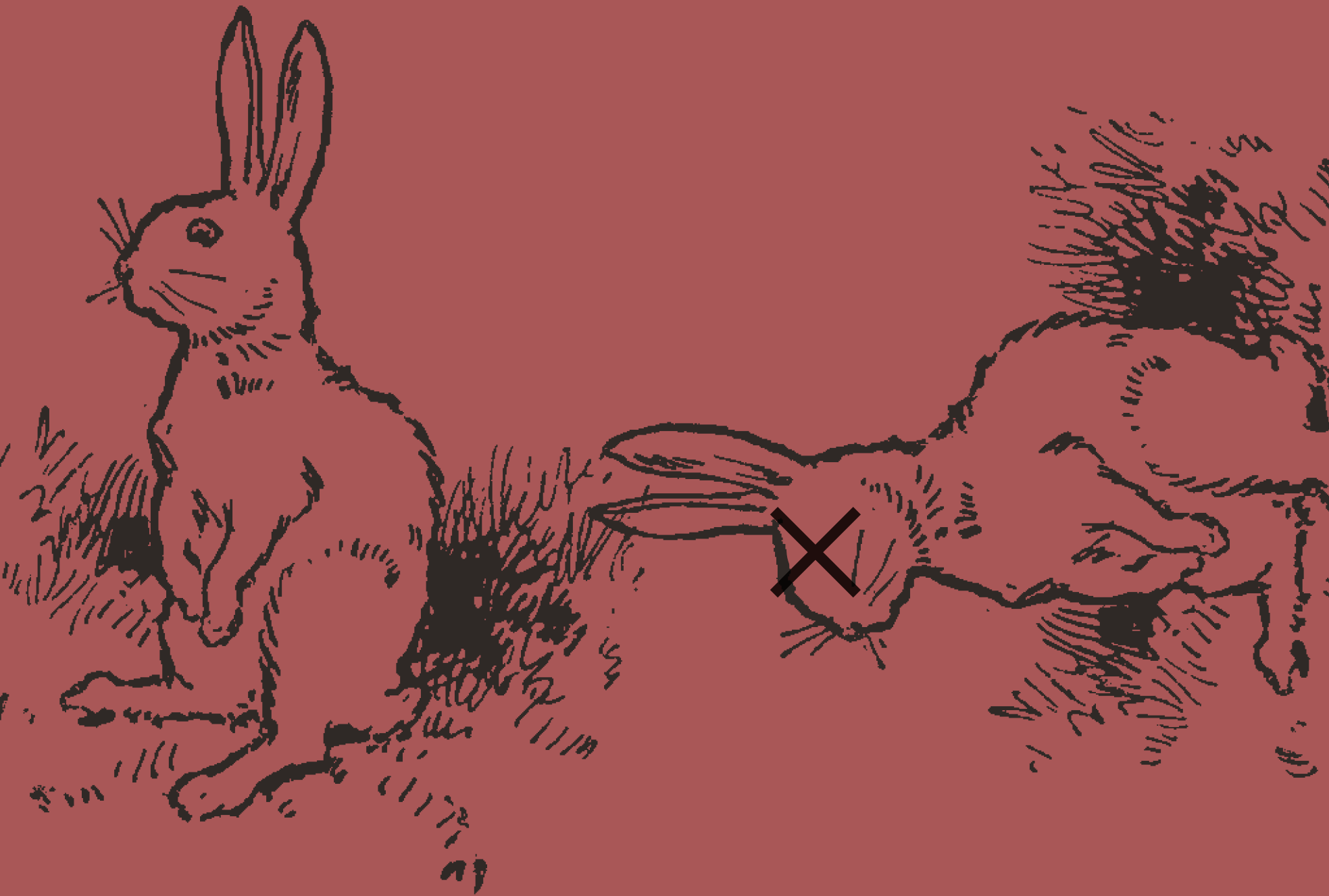
11





AA-169267-3

IKEA
Design and Quality
IKEA of Sweden



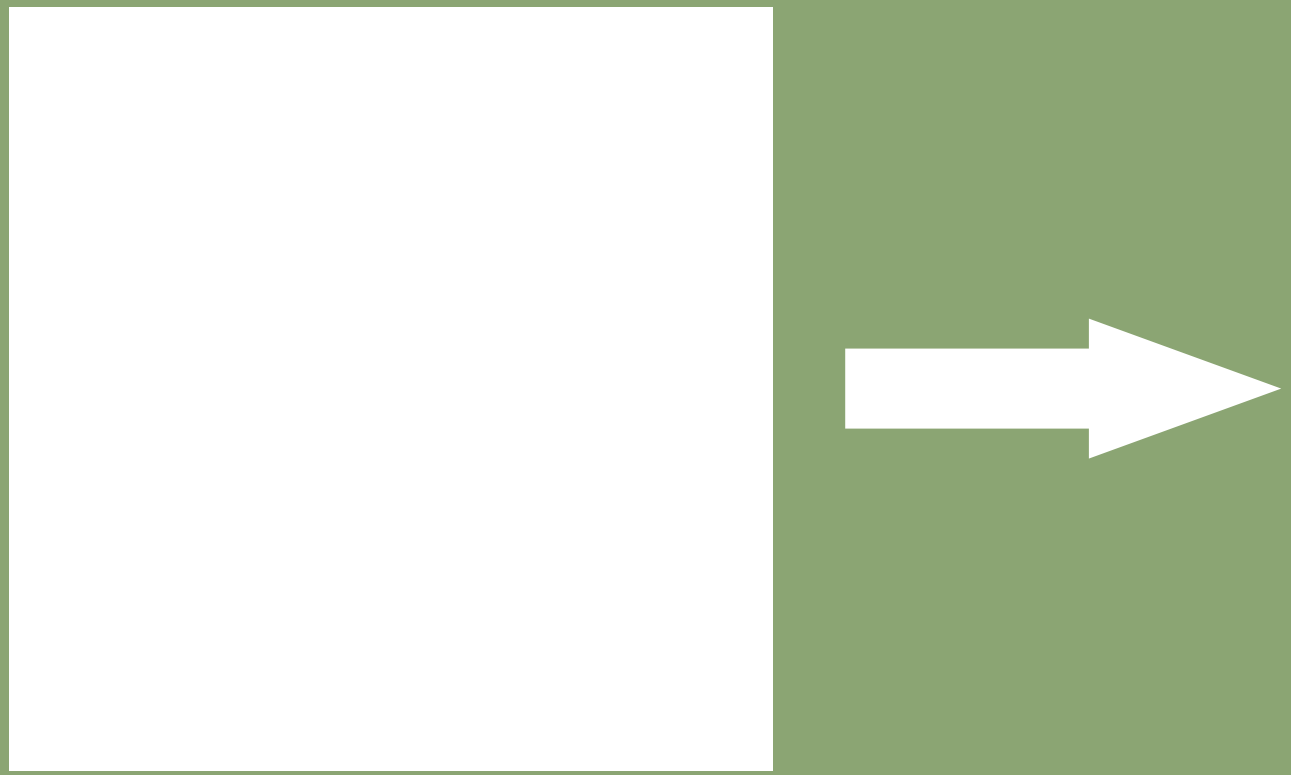
now is the time for

QUESTIONS

SO!

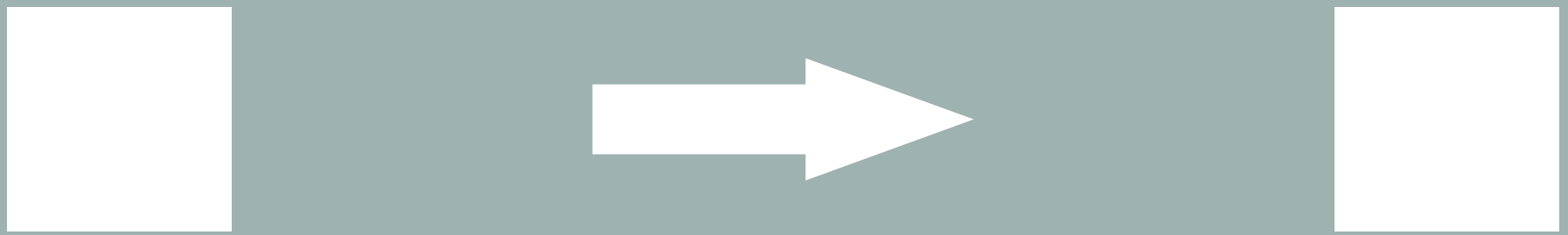
what does this have to do with **DESIGN?**

Basic forms of Motion ...



Newton gives us

CHANGE IN POSITION

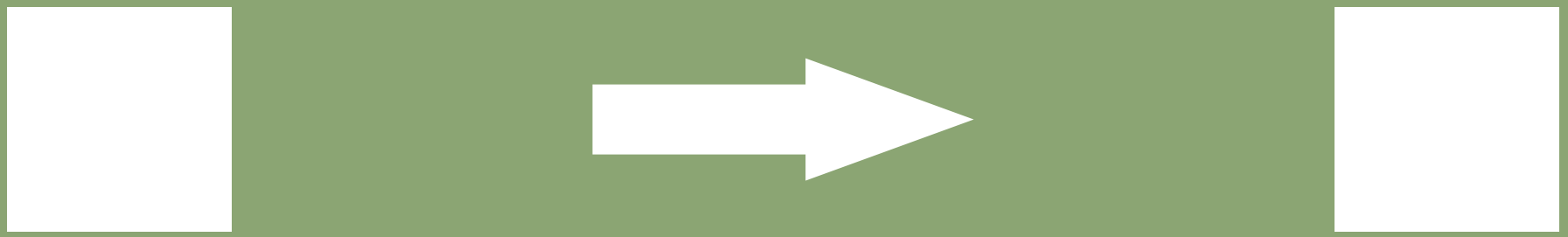


Aristotle confirms

CHANGE IN POSITION

With his type of change:

LOCAL MOTION



Aristotle then adds

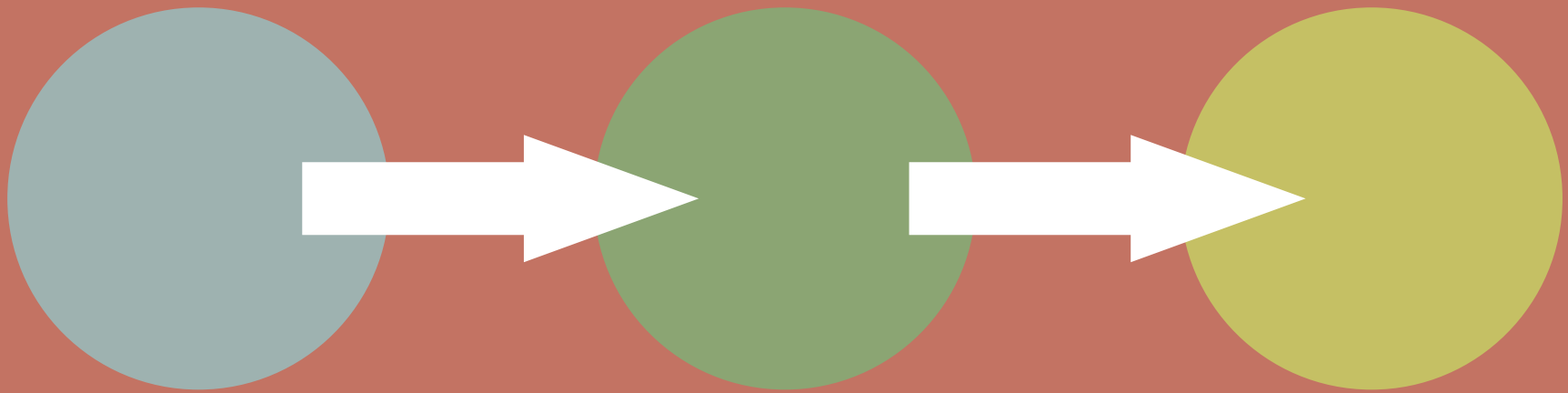
CHANGE IN QUALITY

CHANGE IN QUANITITY

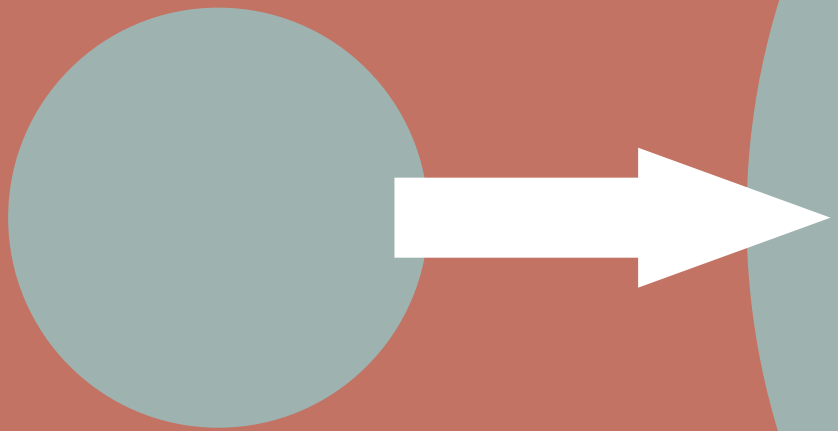
and

CHANGE IN SUBSTANCE

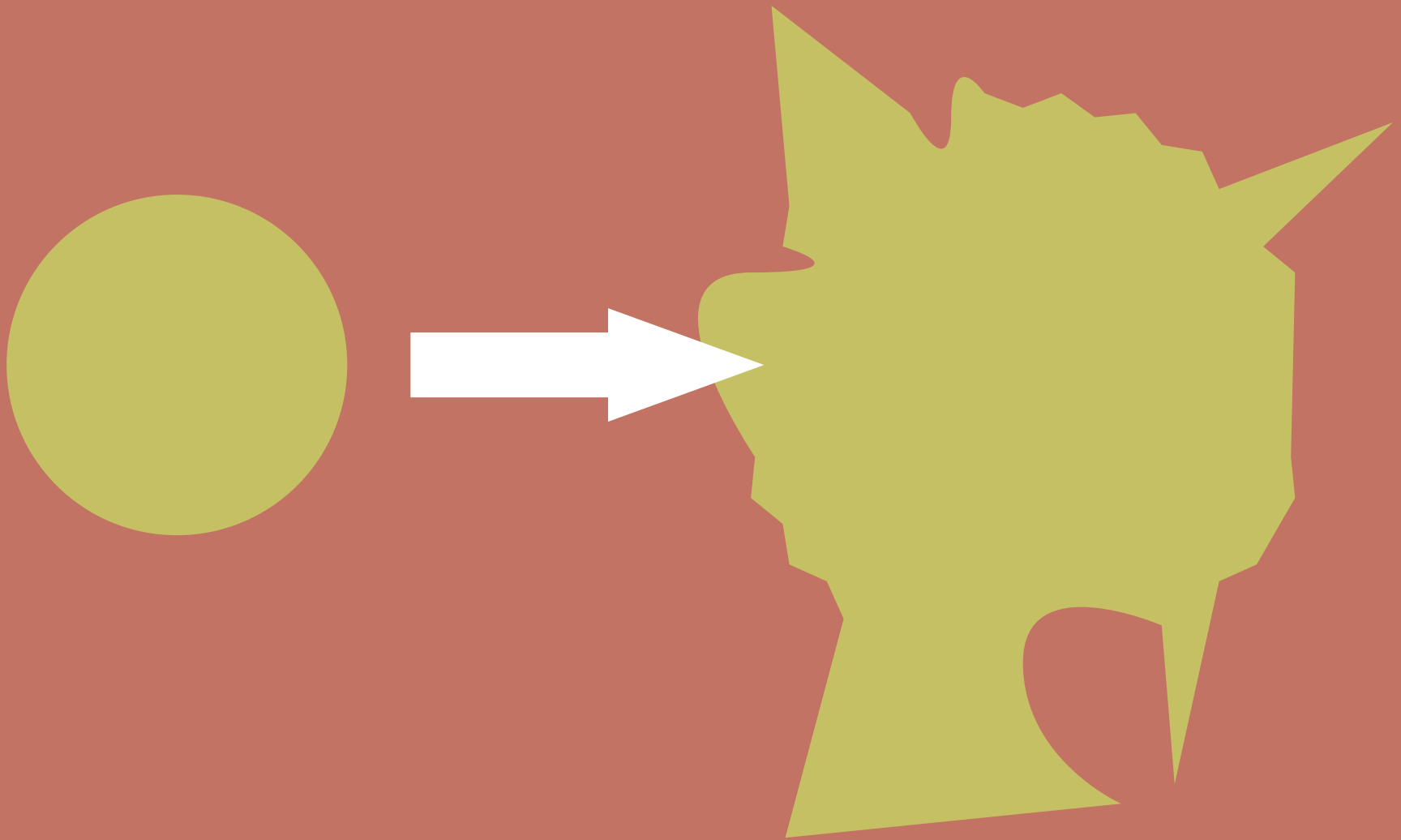
CHANGE IN COLOR



CHANGE IN SCALE

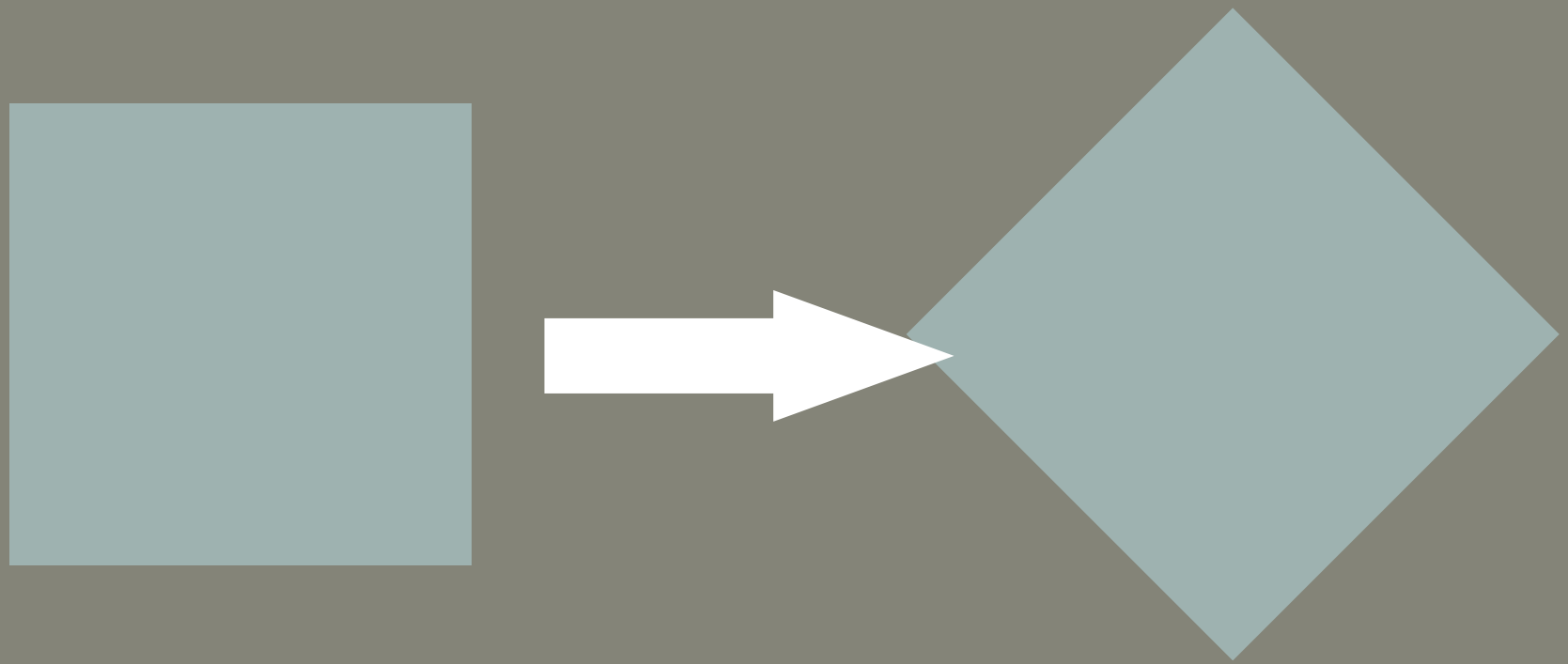


CHANGE IN SHAPE

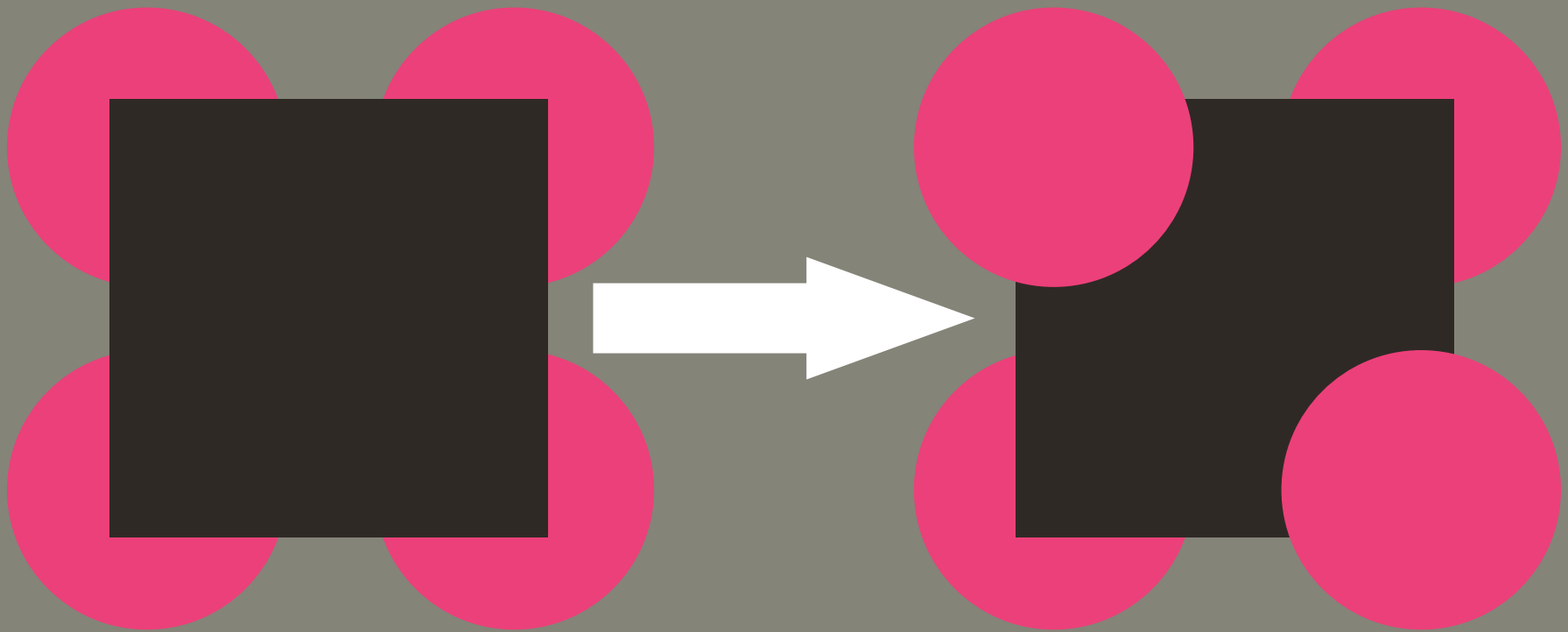


so there's that...
and, we can actually
add a few more
LIKE:

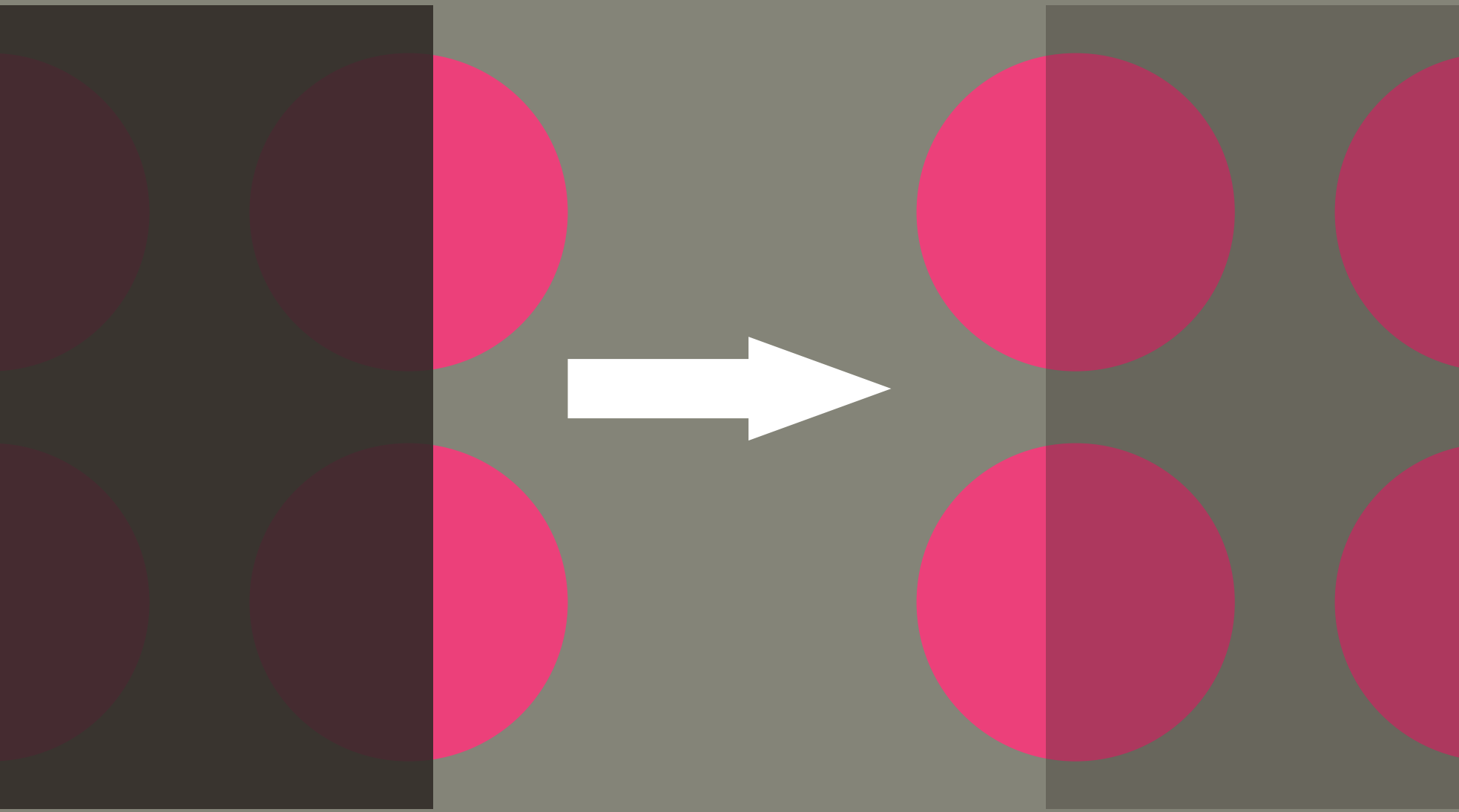
CHANGE IN ROTATION



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

are there any

QUESTIONS?