Navigating the Universe

ISP213H

an
"intellectual history"
of physics

intellectual history?

a little of

this

and a little of that

actually, a lot of this & that

mathematicspoliticalpersonalitybiography historyarthistoryphilosophyscience

allmashedtogether

like it really is

not just facts

an historical account of physics

relationships

contexts

not overnight

humans had to **invent** what a scientific account of the World

is

centuries

that's ISP213H

a study of the invention of

scientific representation

Representation

(loaded word)

more than a description

description

kicked up a notch

beneath the surface

my premise:

the same thing happened in art

and I want to explore that idea

Representing

invented by people

stories

not your father's physics class

different

whatsthisalabout

ISP213H = parts

a front half

and a back half

the front half is different from the back half

the philosophical backdrop for

the ***Birth of Physics***

front half has 3 chapters:

1. Greece
2. Medievalism
3. interlude on Philosophy of Science

back half has 4 chapters:

1. Renaissance
2. Enlightenment
3. Modernism
4. Abstraction

and

the front half is, um...

smaller than the back half

My labels:

Classical Representation: **the Greeks**

Pious Representation: **the Medievals**

Faithful Representation: **the Renaissance**

Precision Representation: **the Enlightenment**

Modern Representation: **the 19th Century**

Abstract Representation: **the 20th Century**

my goals?

physics

connections

but also

hi

how's it work?

reading

we go fast

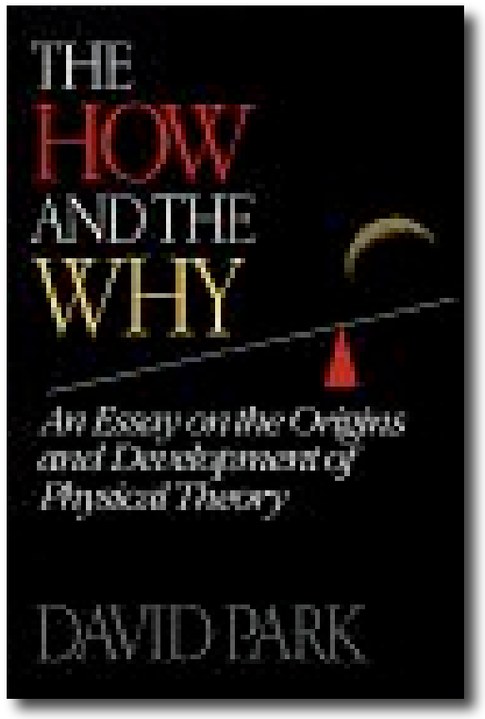
the m-word

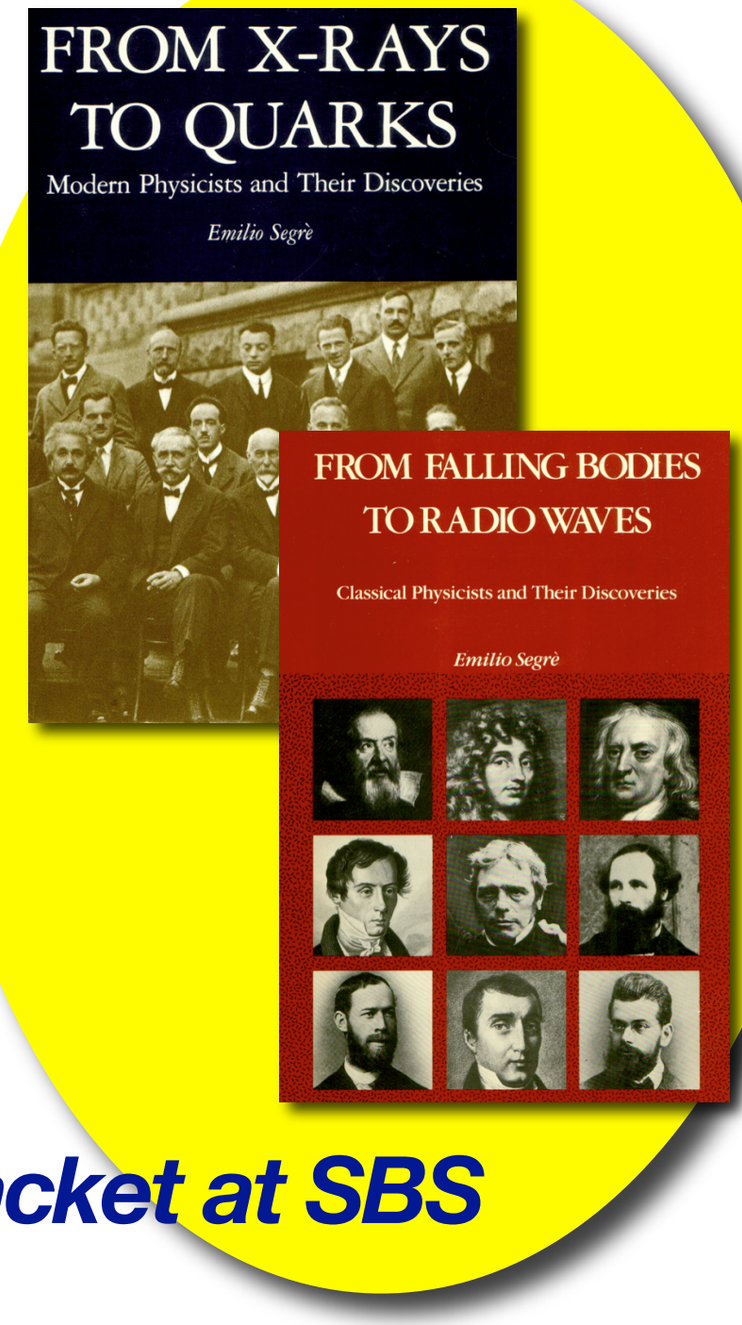
gotta be here

did I say there will be reading?

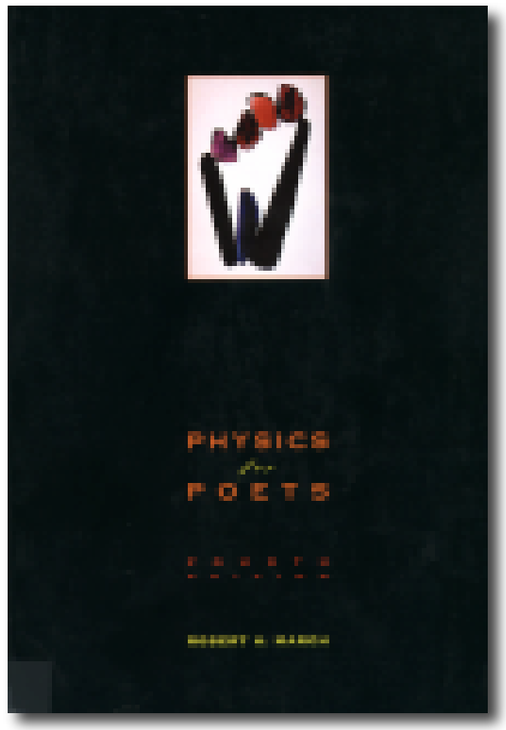
and more reading

and writing



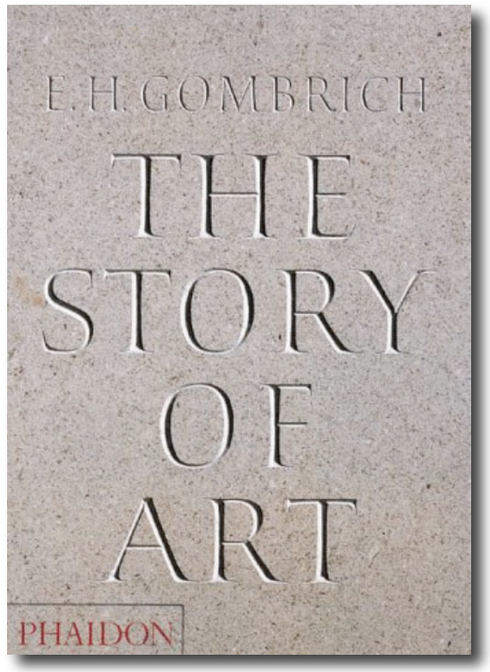


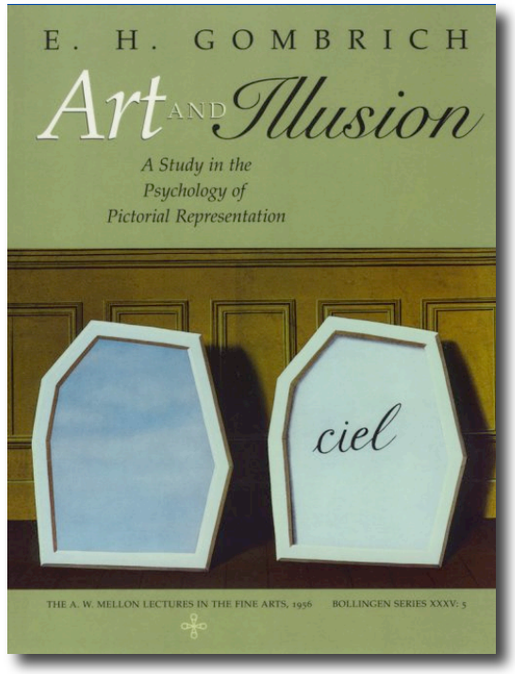
packet at SBS

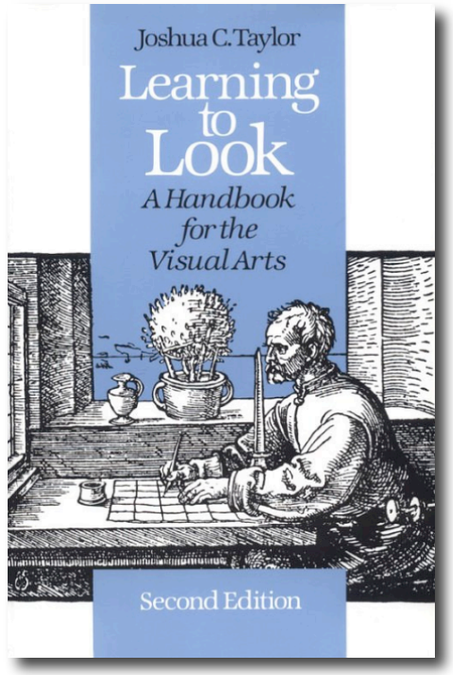


don't buy it new!
but buy it!

if you're interested in the art:







http://www.pa.msu.edu/courses/2008spring/ISP213H/

go there daily

all.homework.announcements.calendar.lecture.
notes.syllabus.readings.grades.blog.everything

index

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ISP213H Navigating the Universe
Spring 2008

Minoan Ladies

Egyptian Geese

welcome

welcome

http://www.pa.msu.edu/courses/2008spring/ISP213H/welcome/welcome

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ISP213H 2008

Navigating the Universe

splash welcome syllabus resources PictureShows calendar postgame

welcome

Sat, Dec 16 2006 04:07 Class Announcements | Permalink

This page should be the first place you go, nearly every day. Here I will make announcements, correct mistakes (!), possibly start a threaded discussion...in short, this blog page will be the bulletin board and lounge area for ISP213H.
Read More....
chipbrock

Comments (1)

chipbrock said ....
This is an example of a comment. The underlying engine for this is Blogger.
January 5, 2008 6:28:00 AM GMT-05:00

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lectures

classical representation
pious representation
scientific knowledge
faithful representation
precise representation
modern representation
abstract representation

Class Announcements

RSS Feed

Raymond Brock Contact Me
splash > welcome >

in order to minimize the

points

weekly journal (~35%)

weekly quizzes (~17%)

take home midterm (~13%)

final (~13%)

book/movie review (~6%)

biography paper (~13%)

instructor (~3%)

stay tuned

email: chipclass@pa.msu.edu

office: 3210 BPS Building

AIM: chipbrock@mac.com

personal web page: http://www.pa.msu.edu/~brock/

research web pages: http://www.pa.msu.edu/hep/hepe/

facebook - search "Raymond Brock"

telephone: 3-1693 (I don't build lofts!)

can you hear me?

...can you hear me now?

shake it up baby,

now. . .

let's shake:

send me a "howdy" using the ISP213 secret code

from the email address that you prefer

I'll reply with a welcome and an MS Word attachment

You reply back-with the ISP213 secret code...with the attachment filled out

start this by Friday

secret code:

“ISP213”

the subject line of any message you send me

little help from my friend

Danielle Larese [lareseda@msu.edu]

office hours

mine:

official — Mon 11am-1pm or

unofficial — IM me / poke me / send me email

or, I guess you could call me on the phone
=:-O

Danielle's: TBA

tips

I'll lecture...you'll listen and interrupt :)

I'll post lecture slides, plus maybe some supporting material

notes?

maybe not details...

jot down something that disturbed you

a follow up off-line

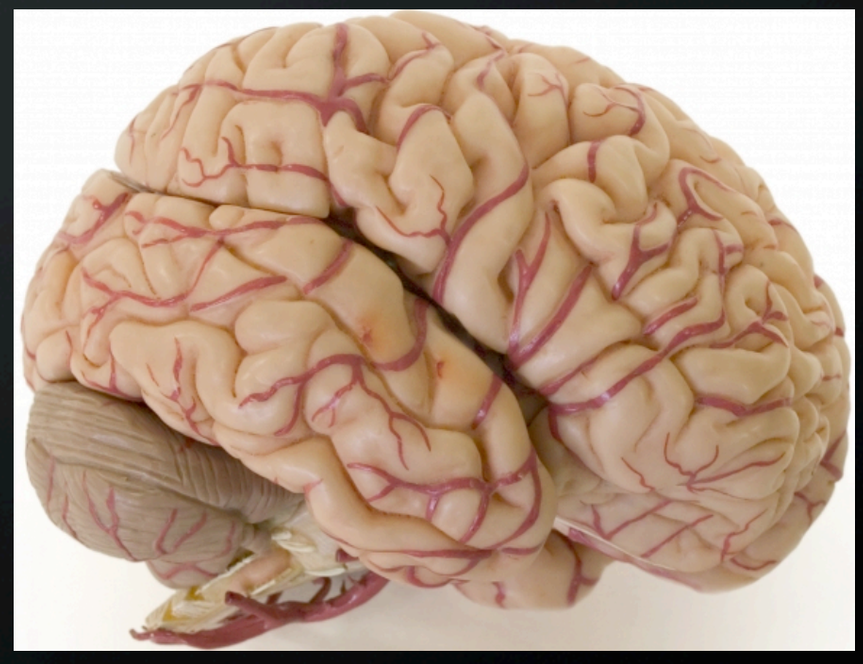
the m-word

mathematics = Latin

no, really.

But, to appreciate it, you have to post-process it.

you cannot learn physics by reading.



here's what I think of you:

the deal:

you come to class, do the work:

You'll learn some physics

and see science differently

and you'll do okay.

not your father's physics class

different

okayokay

art and physics?

naive similarities

things about art:

Art relies on observation and perception

The history of Art suggests that it's episodic

Art is public

Art is a form of non-verbal language

Art has a few heroes and a lot of pretty good artists

Art is a process of abstraction

Old art is as "useful" as new art

What is or is not Art is debatable

things about physics:

Physics relies on observation and perception

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Physics is public

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Physics has a few heroes and a lot of pretty good scientists

Physics is a process of abstraction

Old physics is sometimes as "applicable" as new

What is or is not Science is debatable

drill deeper

a piece of art

1. “representational”

of-something...depiction, *illusion*

(non-representational art is a different story...but it’s not just random)

2. emotionally expressive

just a “depiction”?

usually much more than just that

that’s my **R**epresentation notion

of something...

landscape?

abstraction

deeper still

an interesting complication

how the picture connects with your brain

a piece of art is not “the thing”

An application of pigments of earth, rust, carbonate of copper, juice of some berries, ground bone, and other natural materials (plus probably a drying agent like chalk or ground glass) held in suspension in a sun-thickened or boiled linseed oil base which have been applied by a collection of hog's hair bristle or squirrel hair fastened to a stick of wood and spread on a canvas sheet stretched over wood, onto which a white and possibly gray ground was uniformly applied.

marks on a canvas

not a nose

?

a couple of things

1.

2.

signification

a serious part of Linguistics

“semiotics”

a sign*

standing for something else

words, images, etc.

* a “symbol,” actually...

?

no.

“What one must paint is the image of resemblance—if thought is to become visible in the world.

René Magritte

see

this

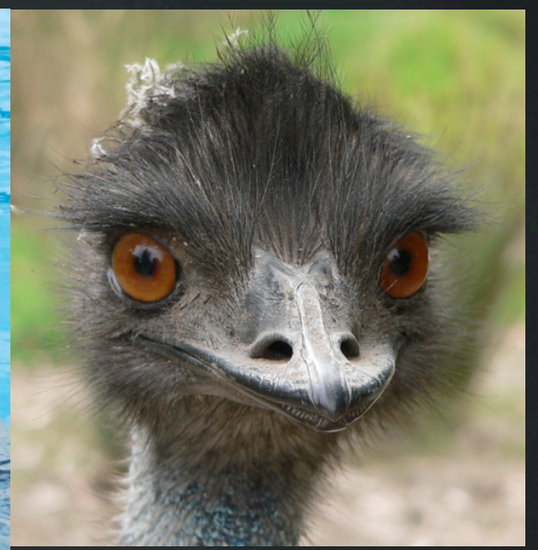
think

that

patches of color, contrast, and line

you recognize...to be a pattern in space

a pattern which
stands for



what do you say?

that you “see” a nose.

in fact: what do you say when you understand something...!


Ceci n'est pas une pipe.

a very complex
cognitive process

required to go from
marks
to Rembrandt's nose

triggering that cognitive process:

is to **R**epresent

by making marks

physics?

a piece of physics

“of something”

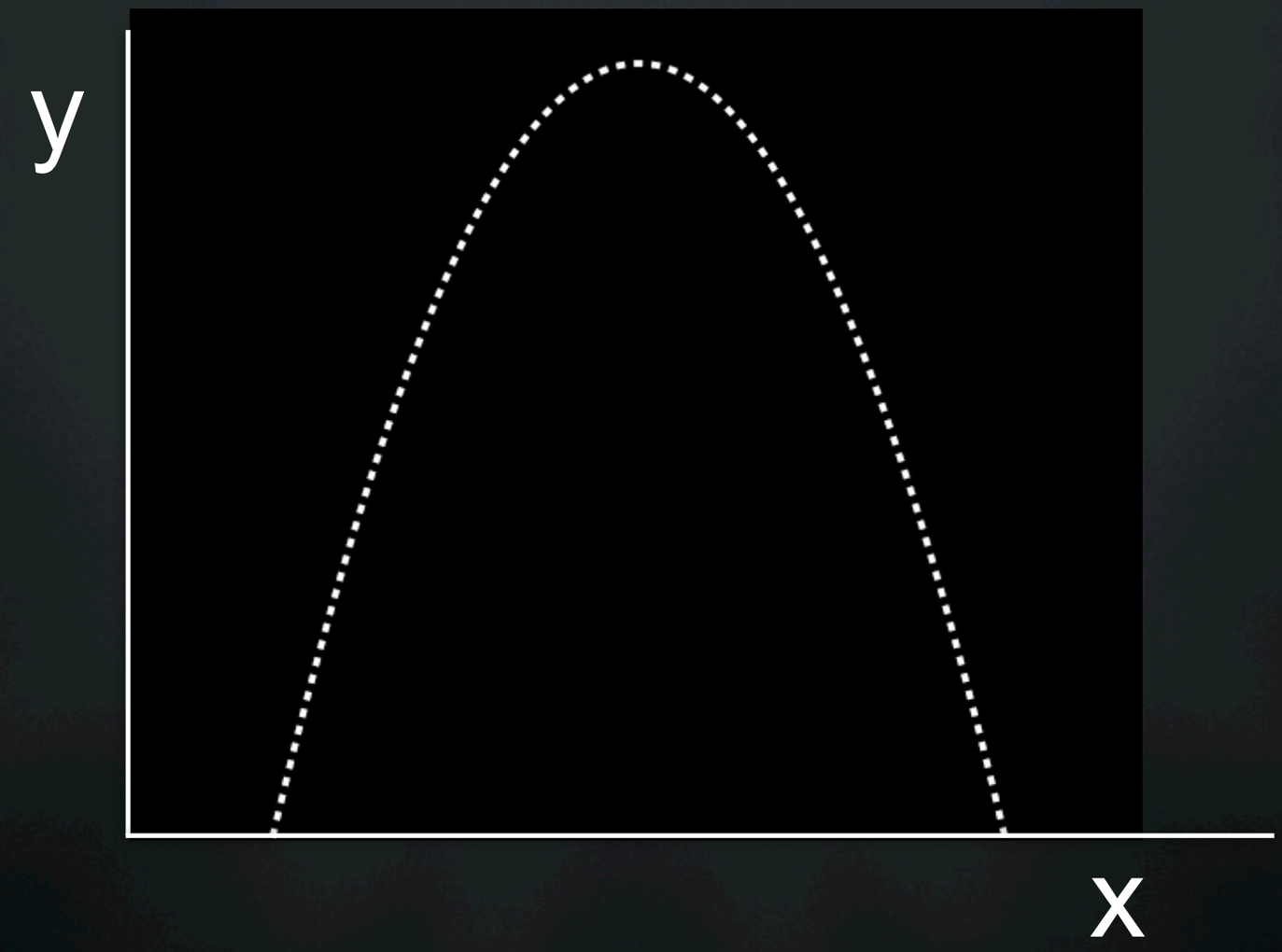
(no emotive component)

marks

more marks on a paper

$$
\begin{aligned}
y(t) &= y_0 + v_{0y}t - 1/2gt^2 \\
x(t) &= x_0 + v_{0x}t
\end{aligned}
$$

$$
\begin{aligned}
y(t) &= y_0 + v_{0y}t - 1/2gt^2 \\
x(t) &= x_0 + v_{0x}t
\end{aligned}
$$



abstraction

how. . .

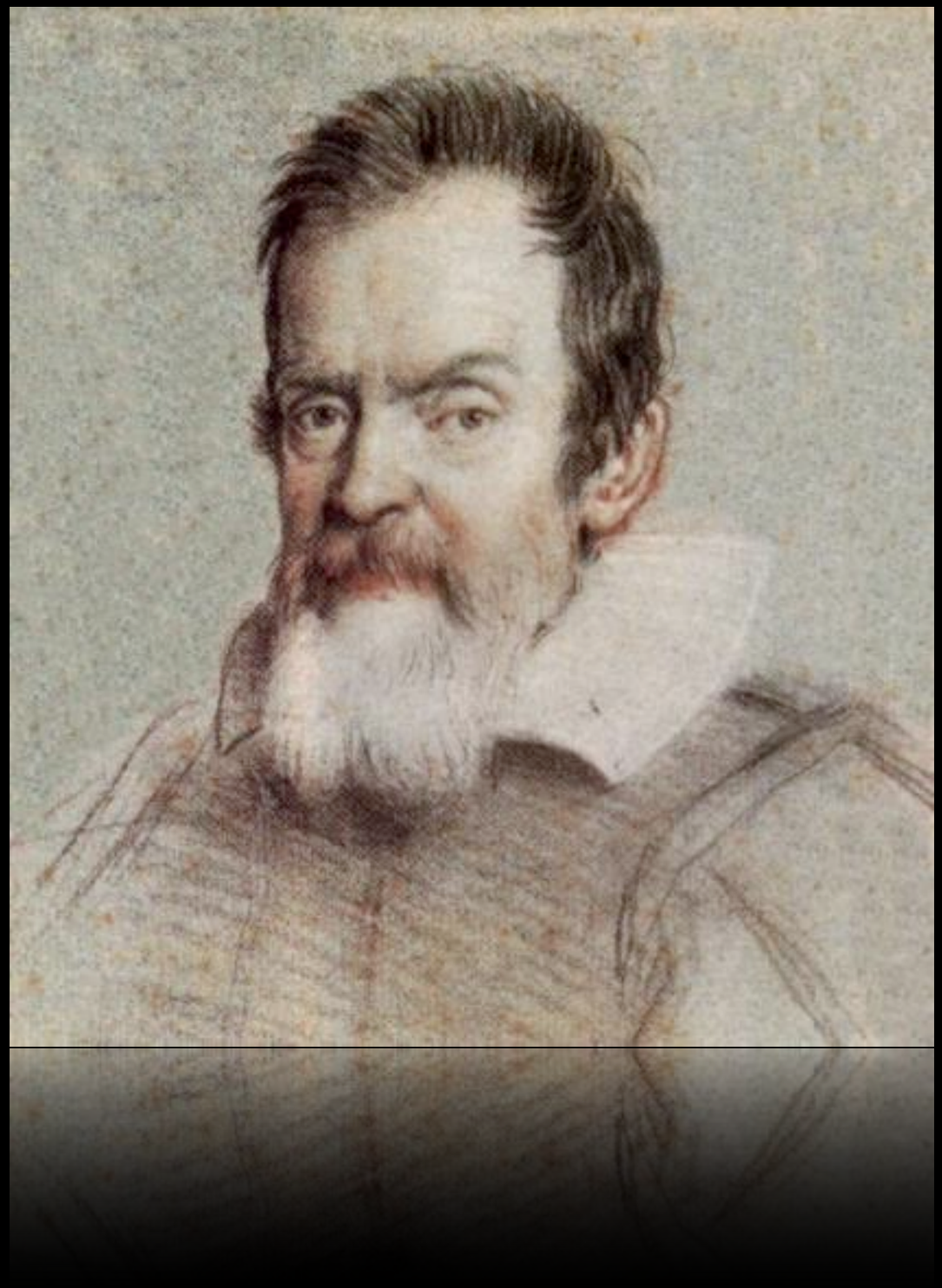
is that different?

I don't think it is.

when we learned

an "artistic sensibility"...

physics was born



hence...ISP213H

are there differences?

you betcha

big time

the future

the past

back up:

a process

“Science”

NAS: “The use of evidence to construct testable explanations and predictions of natural phenomena, as well as the knowledge generated through this process.”

Science, Evolution, and Creationism
ISBN: 0-309-10587-0, 88 pages, 8 x 10, (2008)Science, Evolution, and Creationism
Committee on Revising Science and Creationism: A View from the National Academy of Sciences, National Academy of Sciences and Institute of Medicine of the National Academies

the body of knowledge

again:

evidence: not “belief”

testable: a standard

explanations/
predictions: a consistent Whole

oh, yeah...

“natural phenomena”

is science a faith?

there are two faiths:

the universe is uniform and consistent: future-past, here-there

the universe is knowable

there is one doctrine:

a scientific argument is falsifiable in principle

falsifiable

“in principle”

it means that science is in-principle tentative

physics

does this using a strict language

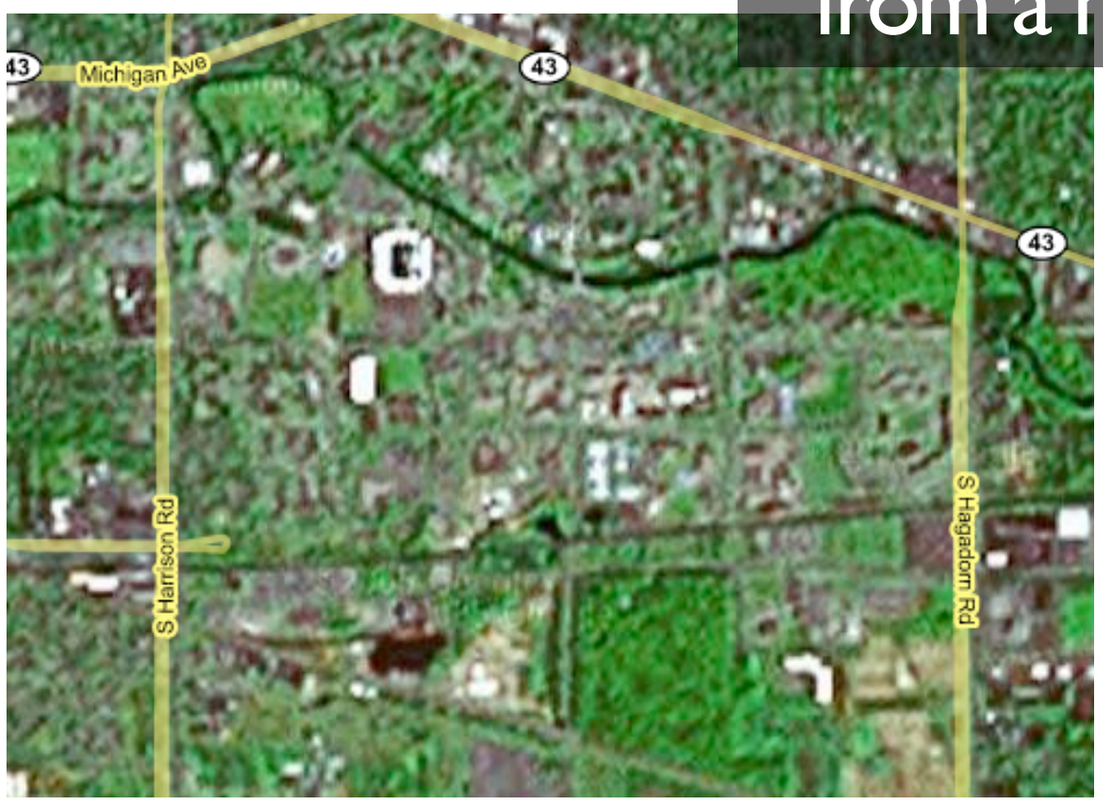
mathematics

mathematical
model~map

sorta

the map is not the thing

I can learn something from a map



why does this work?

probably something about Nature, right?

Eugene Wigner, famous paper, 1960:

"The Unreasonable Effectiveness of Mathematics in the Natural Sciences"

summary:

dunno.

it seems to work.

“The reason that such a situation is conceivable is that, fundamentally, we do not know why our theories work so well.

Eugene Wigner, 1960

physics creates knowledge

does art?

art conveying knowledge:

called “cognitivism”

Food for thought?

Michelangelo transmitted information

he knew it and he conveyed it.

And I learned something

truth or dare

artists speak of telling the truth

science is reputed to tell the truth

sentences

only

possess a truth-value

“understanding”

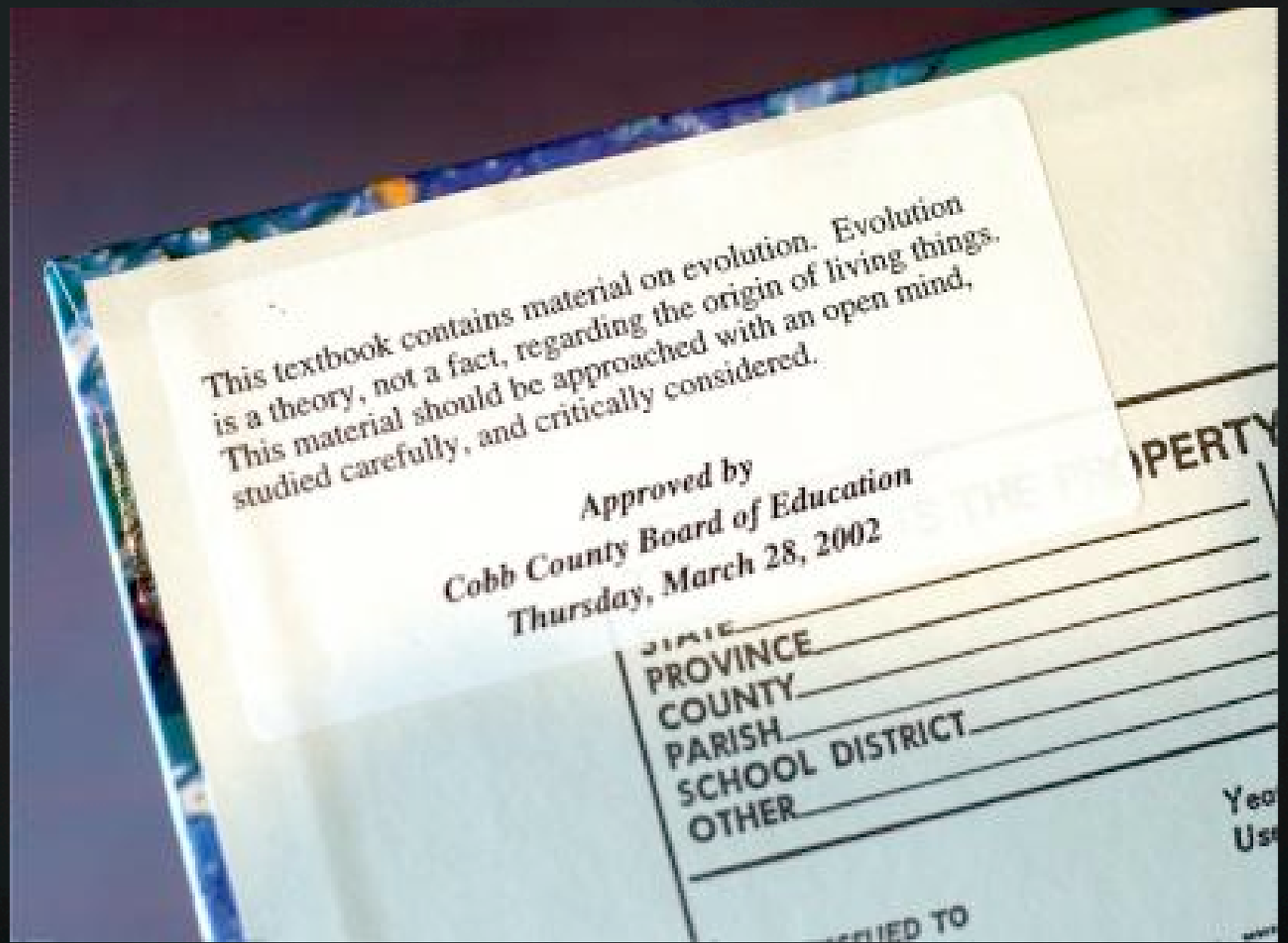
can aspire to TRUTH

but that’s it

"Laws" of Physics?

sloppy, anachronistic language

I'm on a roll now, baby!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“. . . theory and not a fact. . .”

tend to suggest true scientific “Laws” are infallible and final

gimme a famous “law of physics”

$$F = G\frac{M_1 M_2}{r^2}$$

all are active areas of research in 2008

begin tested... “in principle, falsifiable”

there aren't any

Laws of Nature

Nature

may be law-like

if “Laws”

ought to be able to prove it

knowledge

is limited

2 ways

measurement uncertainty

attaining truth?

we'll speak of a journey toward seeking it

A measurement of the mass of the W boson is presented which is based on a sample of 5982 $W \rightarrow e\nu$ decays observed in $p\bar{p}$ collisions at $\sqrt{s} = 1.8$ TeV with the DØ detector during the 1992–1993 run. From a fit to the transverse mass spectrum, combined with measurements of the Z boson mass, the W boson mass is measured to be $M_W = 80.350$ GeV/c^2. Detailed discussions of the determination of the absolute energy scale, the measured efficiencies, and all systematic uncertainties are presented. [S0556-2821(98)01613-0]

never measure with infinite precision
can't know with infinite precision

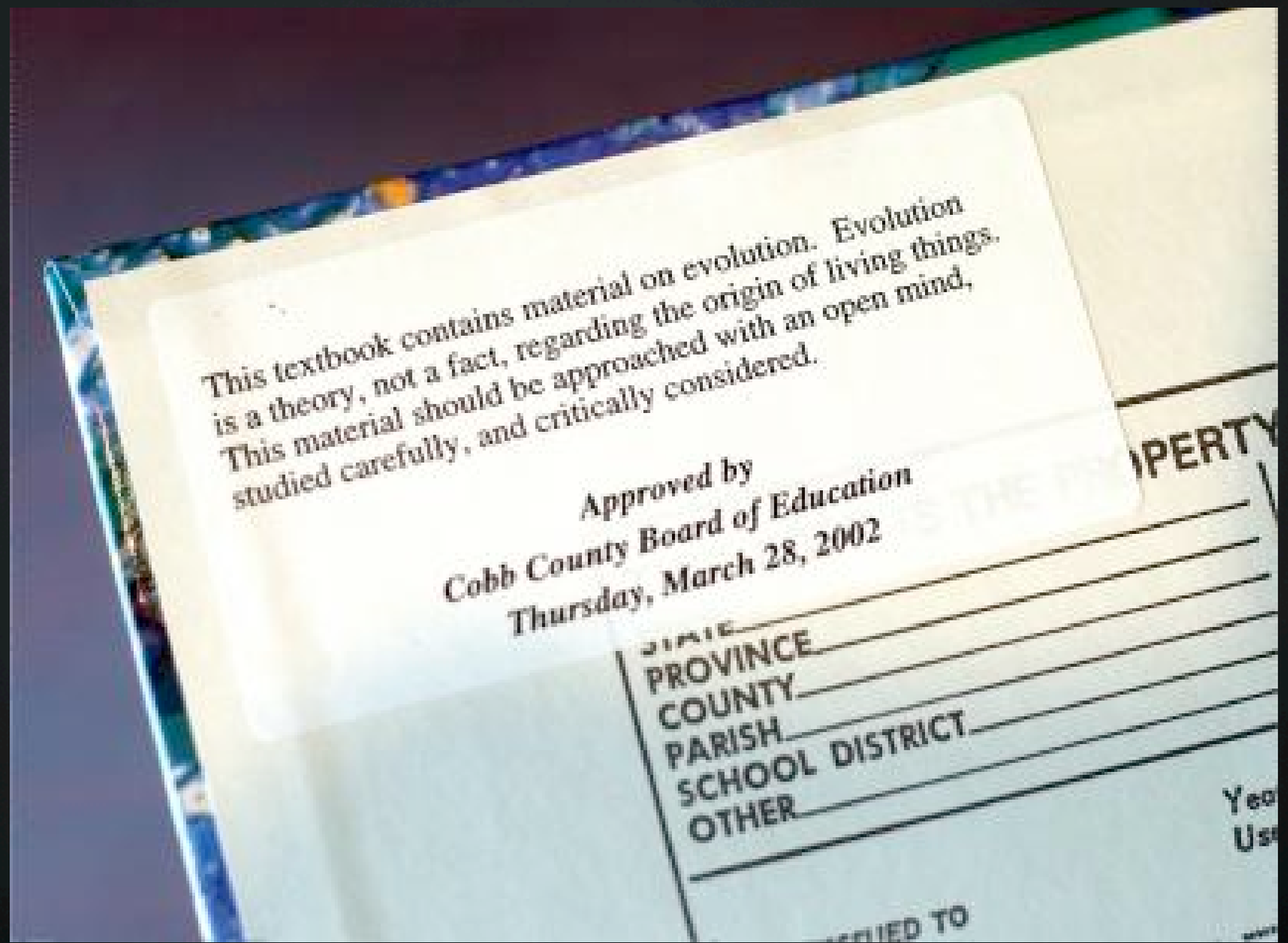
the uncertainty principle

even fundamentally

limited in ways having nothing to do

with measuring tools

misunderstood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it's all theories

this had to be learned

keep in mind: $F = G\frac{M_1 M_2}{r^2}$

That's my story and I'm sticking to it.