Friday:  5 of 5

# Glory, Memes, and Truth: Ethics in Science

Science

[Goal] … systematized knowledge of the workings of nature as expressed through public descriptions, predictions, or explanations of events in nature.

[Method] The method of science is:
a) objective +
b) public +
c) reproducible.

Science is therefore self-correcting.

## Ethics

"Is that study which concerns itself with judgements of:

approval and disapproval,
rightness or wrongness,
goodness or badness,
virtue or vice,
desirability or wisdom of actions, dispositions,
ends, objects or states of affairs".

(Dictionary of Philosopy, Runes, 1962)

# Glory

What is glory?

"...exhalted praise, honor, or distinction bestowed by common consent (of others)..." (Webster)

"exhalted praise, ...," is for originality and priority

# Is there ‘glory’ in scientific research?

Nobel?

..

National Academy of Sciences?

...

..

.

Working with nice people like me! ☺

…. glory and the Matthew effect:

"For unto every one that hath shall be given, and s/he shall have abundance; but for him/her that hath not shall be taken even that which s/he hath". (Merton 1968)

Glory: …. follows from Recognition.

Recognition: …. Follows from AUTHORSHIP of manuscripts…

Authorship:

follows from relative contribution to research project

| | participant 1 | 2 | 3 | 4 | |
|---|---|---|---|---|---|
| 1) conception | | | | | 100 |
| 2) design | | | | | 100 |
| 3) data collection | | | | | 100 |
| 4) data analysis | | | | | 100 |
| 5) writing | ___ | ___ | ___ | ___ | 100 |
| | | | | | 500 |

(R. H. Schmidt: A worksheet for authorship of scientific articles,
(probably Bulletin of the Ecological Society of America, date unknown)

# Obstacles to recognition?

--- Might be your co-workers!

*Title: The Green flash explained*

*By:* John ~~and You~~

# Big John the ????

*Title: The Green flash explained*

*By:* You^and John

# Big John the ……

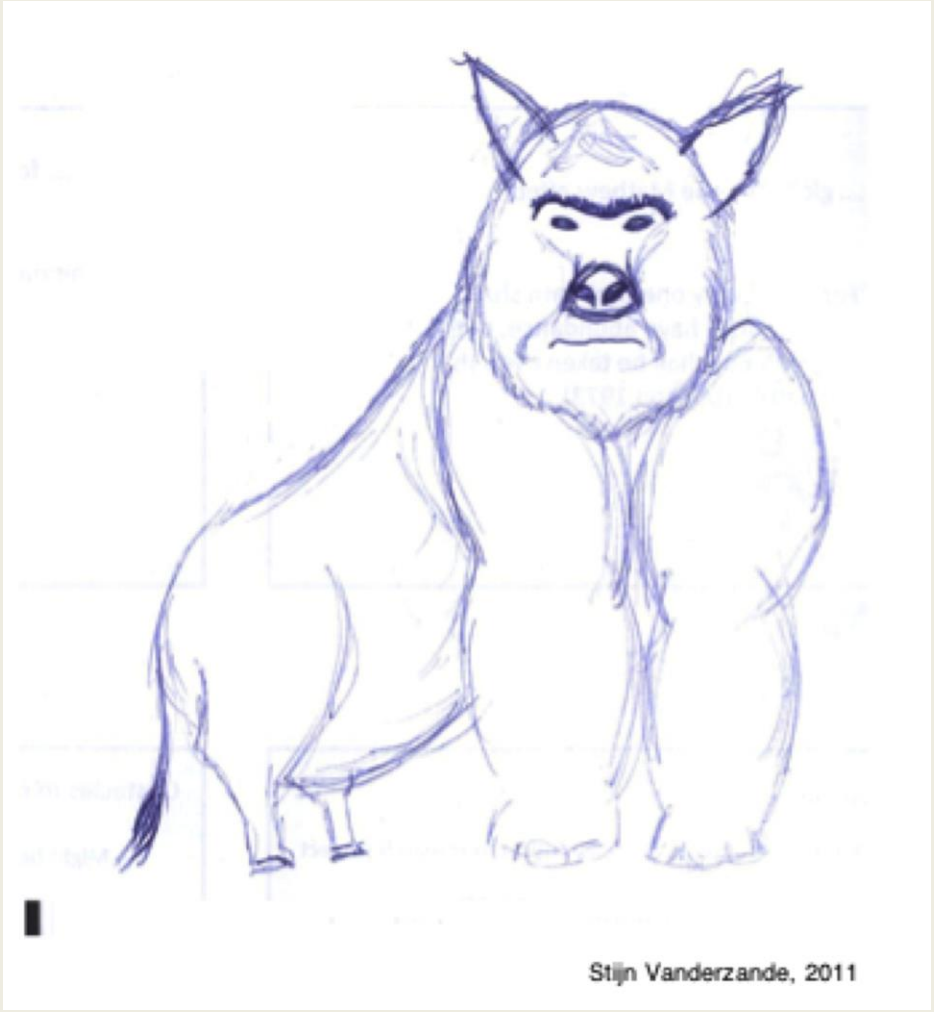
*Title: The Green flash explained*

*By:* Jim and ~~You~~ ^John

# ‘Hogar’

Sorry, no image available

# Oops!




Drawn in 5 minutes by student Stijn Vanderzande, during lecture, 2011.

(A true story.)

field work:

Don Haines, Bill Main, Rodney Sando …… “something about forest fires”

data analysis:

Don Haines, Bill Main, Rodney Sando …… ”something about forest fires”

manuscript preparation and review:

Don Haines, Bill Main, Rodney Sando …… ”something about forest fires”

Research project manuscript final agency approval:

Publication:

Haines, D.A., Von J. Johnson, and W.A. Main, 1976.
“…. something about ….”

‘Glory’ Take Aways:

1) Talk about ‘G’ early on – before work is done.

2) …. establish a policy on research paper authorship.

3) ... must … earn your way onto the authorship list.

4) all who do ‘heavy lifting’ should be considered ...

5) are ways to share ‘G’ besides co-authorship.

# Meme

"A meme should be regarded as a unit of information residing in a brain.” ...
(Dawkins)

Phenotypic effects are the outward and visible (audible, etc.) manifestations of the memes within the brain"  (Dawkins 1982).

… may be in the form of;

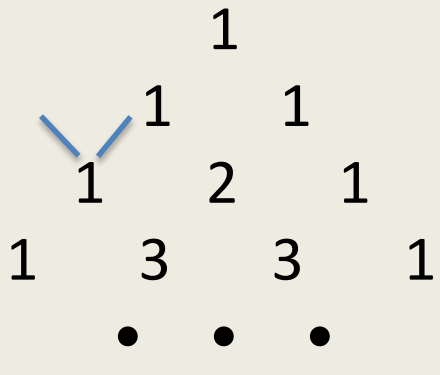
1. words,
2. music,
3. visual images,
4. styles of clothes,
5. facial or hand gestures,
6. skills in (animals)

   (Dawkins 1982)

Example 'phenotypic effects of memes':

1) 1 1 2 3 5 8 13 ••• (Fibonacci??) sequence

2)




(Pascal??) triangle

# Memes vs. Genes:

1) memes may endure 'forever' whereas genes are diluted with succeeding generations.

Pascal's genes have been "diluted" to where any one descendent today would have only $\left(\frac{1}{2}\right)^{11} = \frac{1}{2048}$ of Pascal's genetic material. (Pascal lived 11 gen's back.)

1 11 55 165 330 462 462 330 165 55 11 1

2) human societies have erected norms to protect genes,

BUT

3) society has been slow catching up on ways to protect some memes (IP).

If you have **one** original meme in your lifetime, and you are able to publish a scientific paper on it, you will be a member of a very small and select group.

Remember, the challenge to the scientist is to:

‘see what everyone has seen, but think what no one has thought’.

*A. Szent-Gyorgyi*

# Meme Take Aways:

a) important memes can come from all levels of an organization

b) take care who you share your memes with

c) if you have a new meme, claim it by publishing on it with yourself as senior, if not sole, author

d) don't use other scientist's memes without attribution

e) by all means, don't steal other scientist's memes

f) worst possible fate of a meme is for it to be forgotten [EVB]!

# Truth

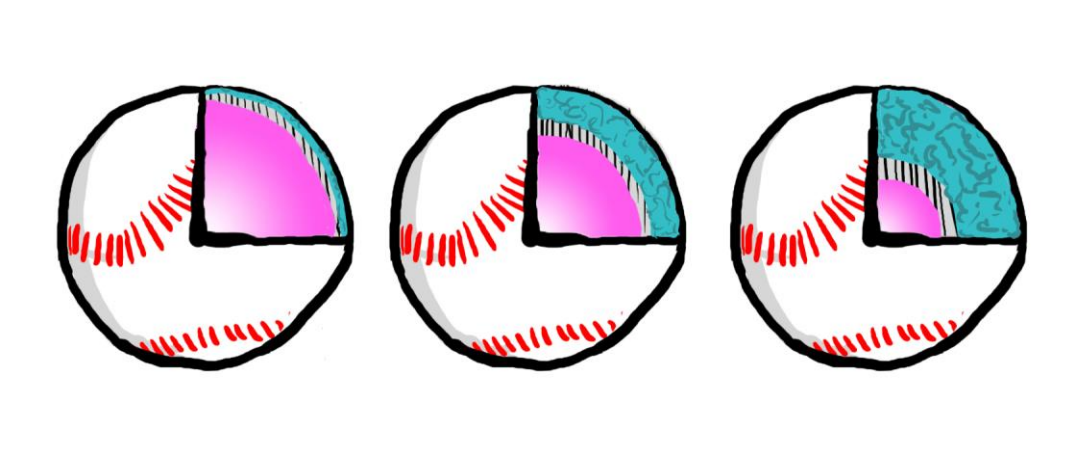
Scientific research is all about the search for truth.

“True” means the meme has survived the toughest of toss tests.

Toss test has three major components:

a) your meme
b) the toss
c) the wall of reality

# What is tossed?



mostly meme
(pink)

mostly fluff
(blue)

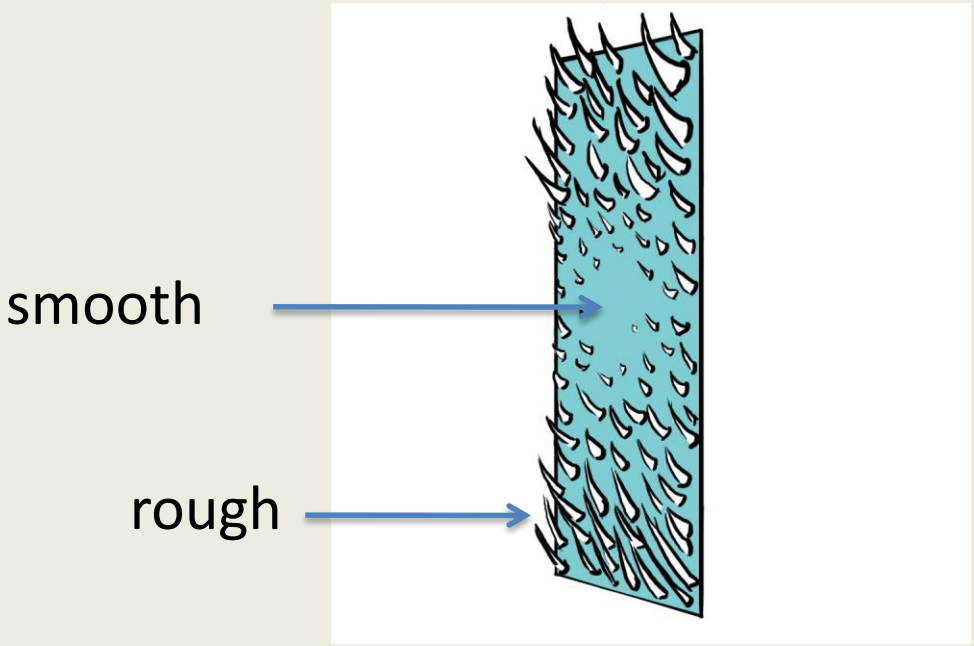
# The toss

fastball

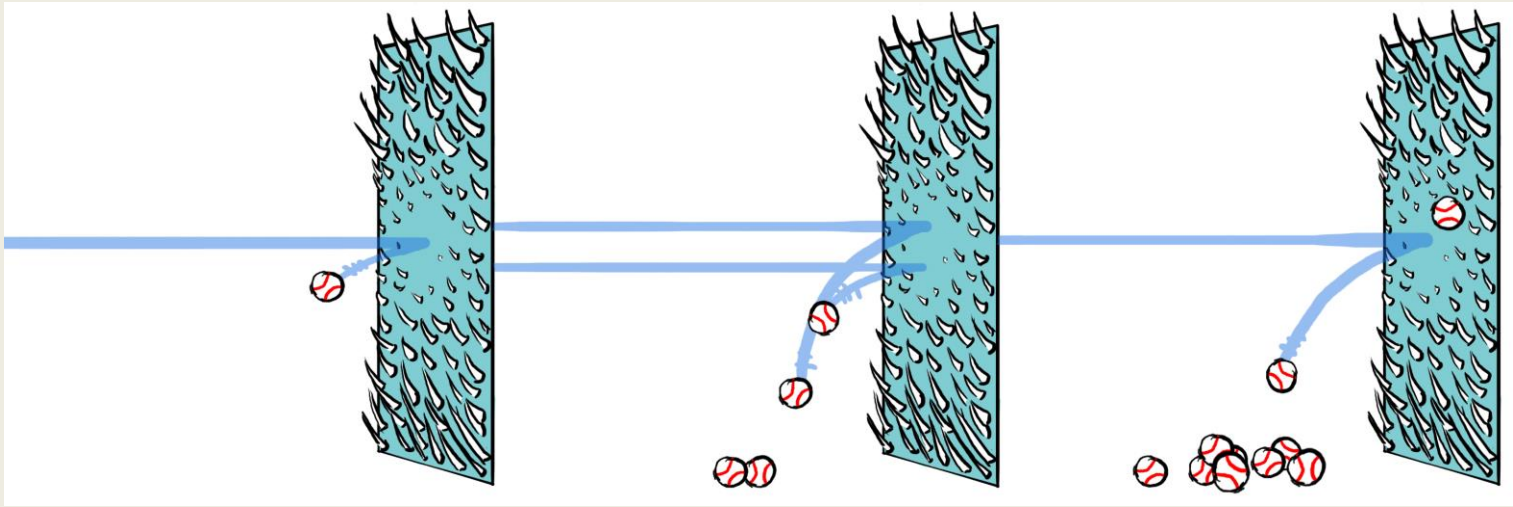
lob

slowpitch

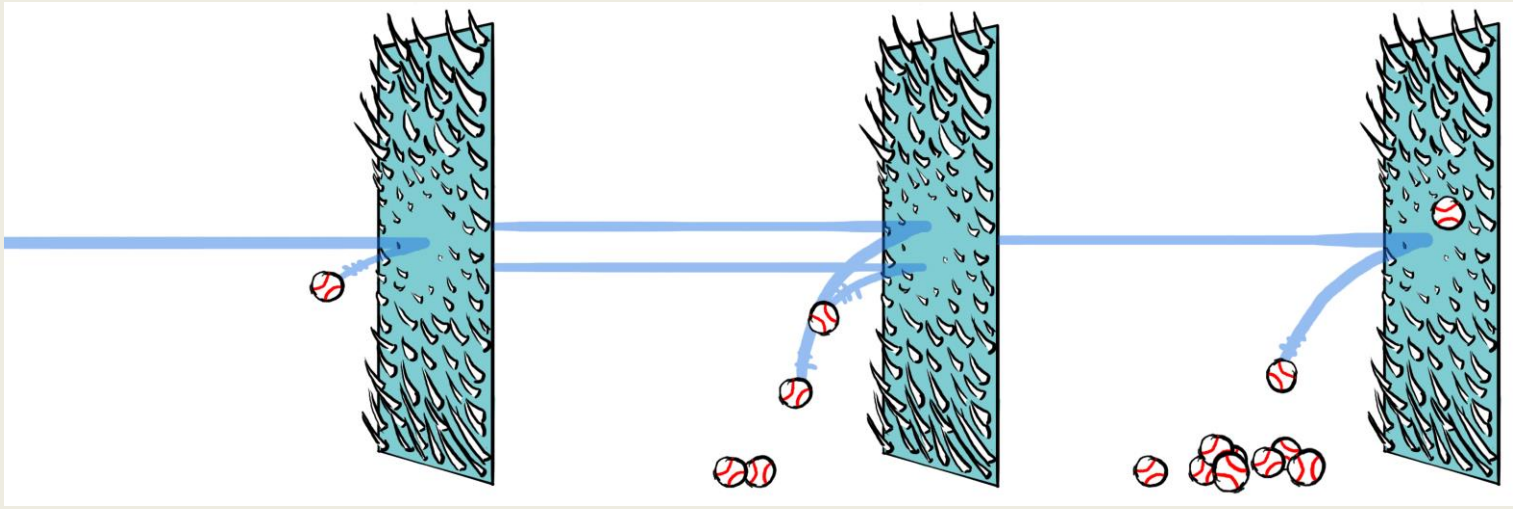
# The wall of reality



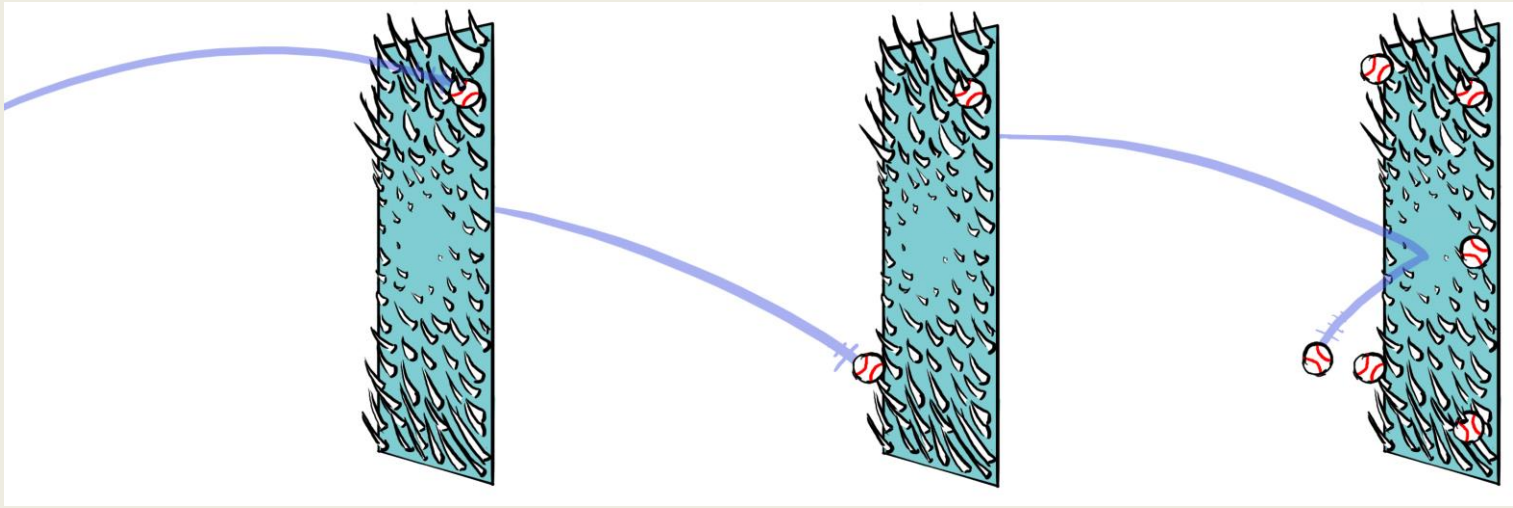
# Tough test



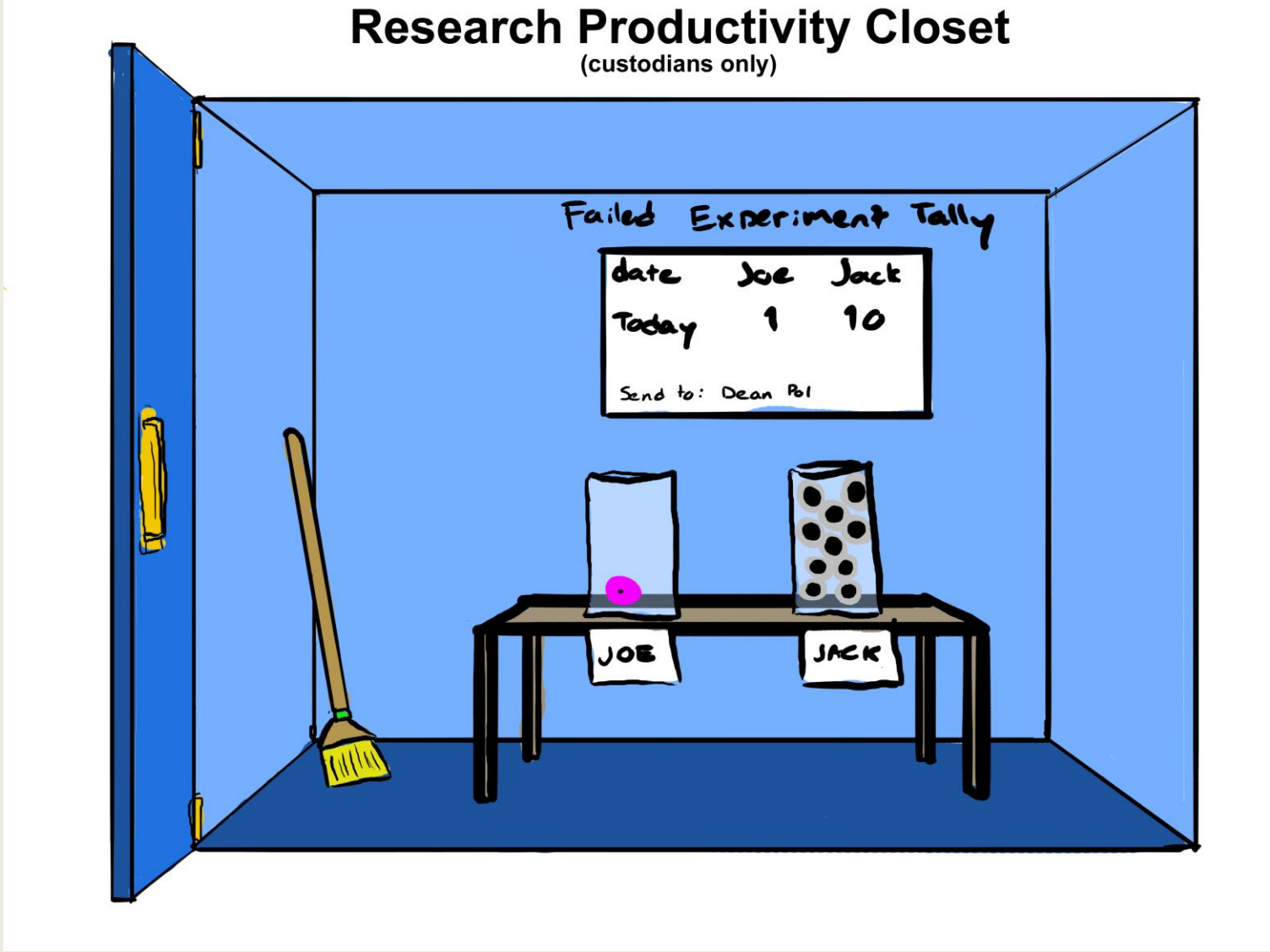
# Tough test



# Easy test



# What happens to failed tosses?



# Overall summary of the state of scientific research?

Scientific establishment says:

science is self-correcting ….

because it includes:

1. (grant) proposal writing and peer review,
2. manuscript refereed peer review, and
3. replication.

As evidence against (‘self-correcting’) the critics cite cases of:

1. Papers published that were copied directly from the literature

2. scientists circumventing peer review and replication and going directly to the media

Reasons offered for ‘breakdown’:

1. too many manuscript to review

2. too many experiments to replicate.

# There is probably a continuum of “betrayal”:

| outright lies or stealing or purposeful deception | self-deception | "sanitizing” or changing data |
|---|---|---|

a) Piltdown man
b) Sir Cyril Burt’s twins
c) Cold fusion  ?

….

d) Black bear as predator

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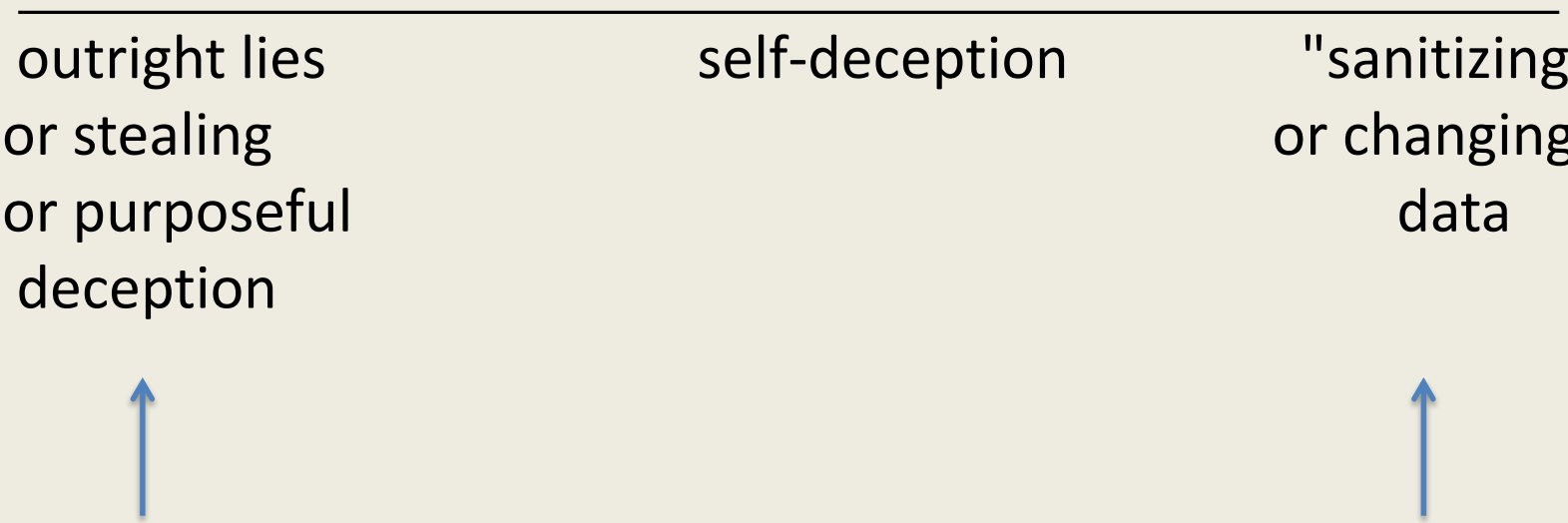


a) Piltdown man
b) Sir Cyril Burt’s twins
c) Cold fusion → ?
….
d) Black bear as predator

a) trimming outliers
b) extreme boot
strapping
….
d) Mendeleev

When computing cost less than measuring, I used bootstrapping.

Now that computing costs nothing, I use jockstrapping.

d) Mendeleev

If some data don’t fit my model,
like Mendeleev,
I expect those data are wrong!

# There is probably a continuum of “betrayal”:

outright lies or stealing or purposeful deception

self-deception

"sanitizing” or changing data

a) Piltdown man
b) Sir Cyril Burt’s twins
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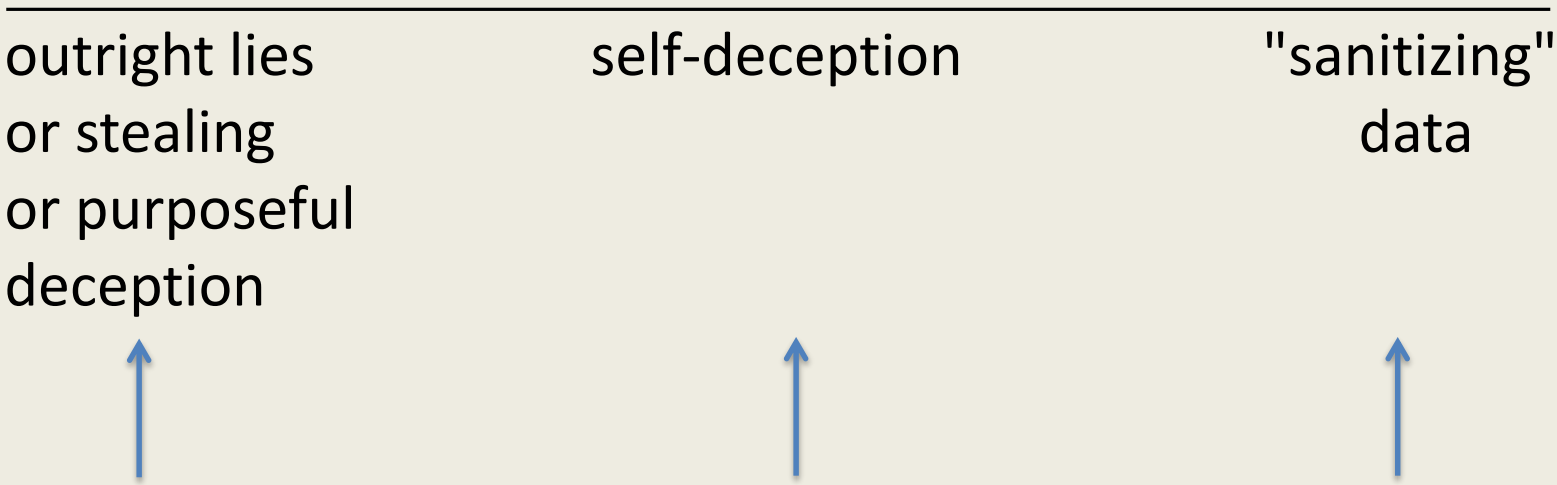

“…science has gotten too competitive, too big, and too entrepreneurial…”

and too political !

Thank you!