

Some background ideas about

Measurement Across the Sciences

Developing a Shared Concept System for Measurement

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“What is measurement?”:

why should we be interested in such a question?

“This is an opinion”

“This is a measurement result”

I suppose we agree that the difference is not purely lexical:
obtaining information by means of measurement
is, in some sense to be discussed, *better*

But **how can this be justified?**

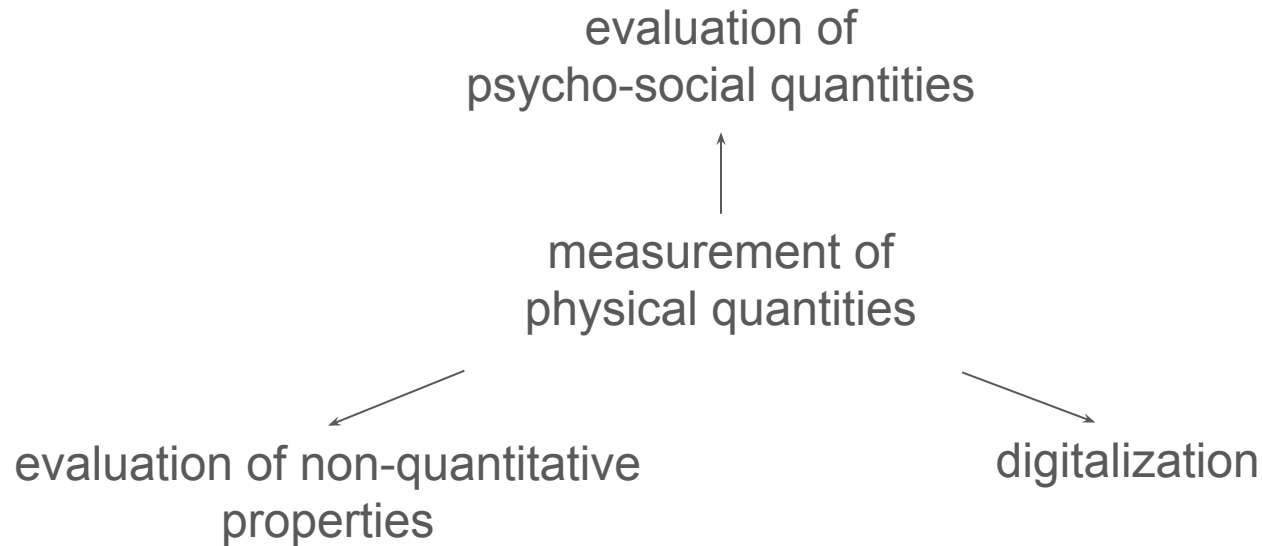
Measurement is something we do, not something we find in nature:
we cannot do an experiment to find an answer

(and “measurement” is not a trademarked term)

“What is measurement?”:

why should we be interested in such a question **now?**

Due to its epistemic prestige, ‘measurement’ is variously stretched:



How broad can the scope of measurement be made?

“What is measurement?”: **is it a new question?**

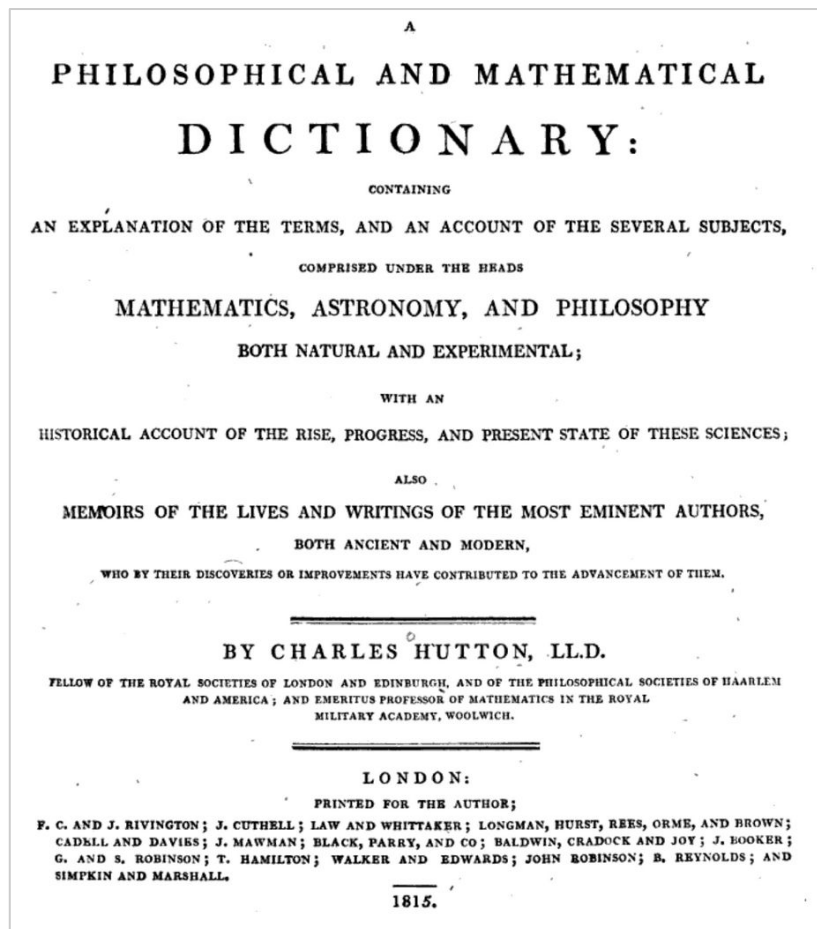
No, but some answers given in the past
have already been superseded

(*hint: what is the source of the expression
“weights and measures”?*)

To justify this claim, let's take a look
for example at...

MEASURE, denotes any quantity, assumed as unity,
or one, to which the ratio of other homogeneous or like
quantities may be expressed.

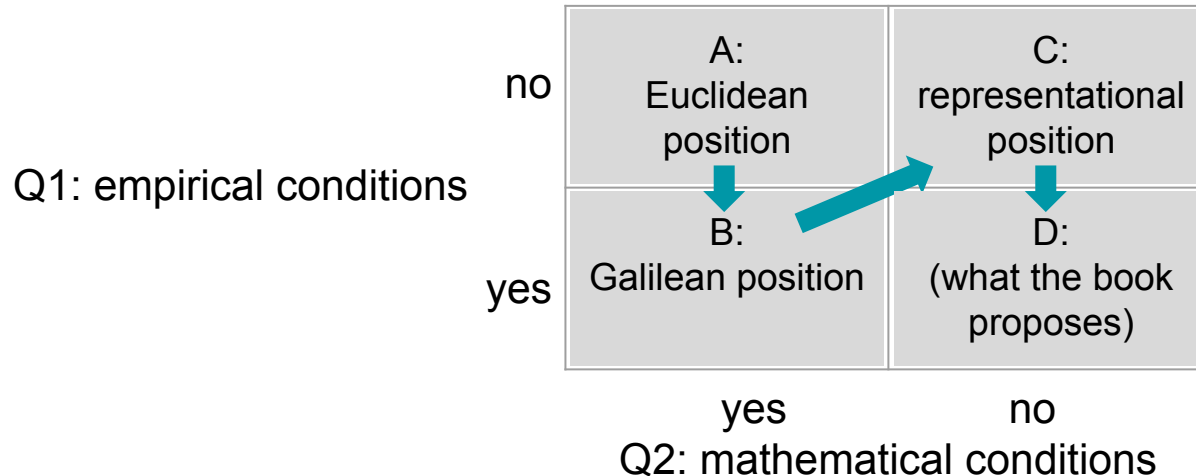
MENSURATION, the act, or art, of measuring figured
extension and bodies; or of finding the dimensions and
contents of bodies, both superficial and solid.



Let us introduce a simple framework, based on two questions:

(Q1) are **empirical** conditions relevant for the definition of ‘measurement’?

(Q2) are **mathematical** conditions relevant for the definition of ‘measurement’?



“What is measurement?”: back to the roots (about its epistemic prestige)

It is not a matter of truth or of quality...

(there is nothing contradictory in bad measurement)

... but of **public and transparent statement of trustworthiness**...

(hence, what is contradictory is the idea of “principled black box” measurement)

... where establishing how trustworthy a measurement result is depends on:

- the connection between the result and what is measured
(that is why measuring instruments are improved)
→ object relatedness (let us call it **objectivity**)
- the shared understanding of the result
(that is why metrological systems – including systems of units, measurement standards, traceability chains – are improved)
→ subject independence (let us call it **intersubjectivity**)

evaluation of
psycho-social quantities



measurement of
physical quantities



evaluation of
non-quantitative properties



digitalization

A lot of open issues!

But it is clear (to me...) is that our society needs tools for producing information equipped with **public and transparent statement of trustworthiness...**

... and measurement is the best of such tools we developed in human history

A proposal for discussion (an expanded draft with respect to what is in the book):

Measurement is a designed empirical and informational process whose input is an empirical property of an object and whose output is information in the form of values of that property, where this information is causally grounded in the property intended to be measured and is accompanied by meta-information that publicly and explicitly justifies the trustworthiness of those values.

Thank you for your attention

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