

Sir Isaac Newton:
PHILOSOPHIÆ NATURALIS PRINCIPIA MATHEMATICA.
LIBER TERTIUS: DE MUNDI SYSTEMATE.
REGULÆ PHILOSOPHANDI.

REGULA I.

*Causas rerum naturalium non plures admitti debere, quam quæ
& veræ sint & earum phænomenis explicandis sufficient.*

Dicunt utique philosophi: Natura nihil agit frustra, & frustra fit per plura quod fieri potest per pauciora. Natura enim simplex est & rerum causis superfluis non luxuriat.

*No more causes of natural things should be allowed than those
that are AND true AND sufficient to explain their appearances.*

Scientists say anyway: Nature does nothing in vain, & it is in vain to do by more what can be done by less. After all, nature is simple & does not benefit from superfluous causes of things.

HR: this is an obvious rejection of assumptions.

REGULA II.

Ideoque effectuum naturalium ejusdem generis eadem assignandæ sunt causæ, quatenus fieri potest.

Therefore natural effects of the same kind must be assigned the same causes, as far as possible.

REGULA III.

Dualitatis corporum quæ intendi & remitti nequeunt, quæque corporibus omnibus competunt in quibus experimenta instituere licet, pro qualitatibus corporum universonum habende sunt.

That of a body which can neither be intensified nor remitted, whilst it occurs for all bodies with which experiments can be done, should be considered a universal property of these bodies.

(followed by explanation of over a page)

HR: he forgot to mention this is called induction.

REGULA IV.

In philofophia experimentalī, propofitiones ex phænomenis per inductionem collectæ, non obstantibus contrariis hypothefibus, pro veris aut accurate aut quamproxime heberi debent, donec alia occurrerint phænomena, per quæ aut accuratiores reddantur aut exceptionibus obnoxia.

Hoc fieri debet ne argumentum inductionis tollatur per hypothefes.

In observation-based science, propositions collected by induction from phenomena must, notwithstanding any contrary assumptions, be considered true or accurate or approximate, until other phenomena occur, by which either more accuracy is rendered or they become liable to exceptions.

Therefore no evidence by induction should be gainsaid by assumptions.

Scholium generale:

(...) Rationem vero harum gravitatis proprietatum ex phænomenis nondum potui *deducere* & **hypothesefes non fingo**. Quicquid enim ex phænomenis non deducitur, *hypothesifis* vocanda est; & **hypothesefes** feu metaphysicæ, feu physicæ, feu qualitatatum occultarum, feu mechanicæ, **in *philosophia experimentalis* locum non habent**. In hac philosophia propositiones deducuntur ex phænomenis, & redduntur generales per *inductionem*. (...)

But the reason for these properties of gravitation have I **not yet been able to deduce from phenomena** & **I do not fabricate assumptions**. For whatever has not been deduced from phenomena is called an *assumption*; & **assumptions** be they metaphysical, be they physical, be they of hidden qualities, be they mechanical, **have no place in *observation-based science***. In this type of science propositions are deduced from phenomena, & rendered general by *induction*.

(...) Rationem vero harum gravitatis proprietatum ex phænomenis nondum potui *deducere* & **hypothesefes non fingo**. Quicquid enim ex phænomenis non deducitur, *hypothesifis* vocanda est; & **hypothesefes** feu metaphysicæ, feu phycicæ, feu qualitatatum occultarum, feu mechanicæ, **in *philosophia experimentalis* locum non habent**. In hac philosophia propositiones deducuntur ex phænomenis, & redduntur generales per *inductionem*. (...)

*Maar de oorzaak van deze eigenschappen van de zwaartekracht heb ik **nog niet uit verschijnselen kunnen afleiden** & **ik zuig niks uit mijn duim**. Alles immers wat niet uit verschijnselen is afgeleid heet een **aanname/veronderstelling**; & **aannames/veronderstellingen** of ze nu metafysisch zijn, dan wel fysisch, ofwel van verborgen kwaliteiten, dan wel mechanisch, **hebben in de waarnemingsgebaseerde wetenschap geen plaats**. In deze tak van wetenschap worden proposities afgeleid uit verschijnselen, & als algemeen geldig weergegeven door inductie.*

MICROGRAPHIA:

By ^{Robert} R. HOOKE, Fellow of the ROYAL SOCIETY.

MDC LX V.

The truth is, the Science of Nature has been already too long made only a work of the Brain and the Fancy: It is now high time that it should return to the plainness and soundness of Observations on material and obvious things.

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Antoine Laurent de Lavoisier (1743-1794)

Traité élémentaire de chimie, éd. Cuchet, 1789, Discours préliminaire, p. vij

C'est une principe bien constant, & dont la généralité est bien reconnue dans les mathématiques, comme dans tous les genres de connoissances, que nous ne pouvons procéder pour nous instruire, **que du connu à l'inconnu.**

*It is a rightly constant principle, of which the generality is well recognized in mathematics, as in all kinds of knowledge, that we can proceed to instruct ourselves **only from the known to the***
[HR: yet] *unknown.*

(**Bold** face by HR).

Antoine Laurent de Lavoisier (1743-1794)

Traité élémentaire de chimie, éd. Cuchet, 1789, Discours préliminaire, p. viij

(...) les idées ne doivent être qu'une conséquence ,
une suite immédiate d'une expérience ou d'une observation.

*Ideas should be only a consequence,
something that immediately follows
from an experience or an observation.*

HR: *do not concoct something to "explain" the
observed, but draw a **conclusion** from it.*

Note: *conclude is not: thinking up something
based on a finding, but: if this then it must be that etc.*

In Dutch: *dus, derhalve, daarom, deswege, dientengevolge.*

Niet: *daartoe, maar: daardoor.*

Antoine Laurent de Lavoisier (1743-1794)

Traité élémentaire de chimie, éd. Cuchet, 1789, Discours préliminaire, p. x-xj

Le seul moyen de prévenir ces écarts , consiste à **supprimer** ou au moins à **simplifier autant qu'il est possible le raisonnement**, qui est de nous & qui seul peut nous **égarer** ; à le mettre continuellement à **l'épreuve de l'expérience** ; à **ne conserver que les faits** qui ne sont que des données de la nature , & **qui ne peuvent nous tromper** ; à ne chercher la vérité que dans l'enchaînement naturel des expériences & des observations , de la même manière que les Mathématiciens parviennent à la solution d'un problème par le simple arrangement des données , & en réduisant le raisonnement à des opérations & simples , à des jugemens si courts , qu'ils ne perdent jamais de vue l'évidence qui leur sert de guide.

*The only means of preventing these discrepancies consists in **suppressing** or at least in **reducing as much as possible the reasoning**, which is ours and which alone can lead us **astray**; to continually put it to the **proof by experience**; to **preserve only the facts** which are just natural data, and which **cannot deceive us**; to seek the truth only in the natural sequence of experiences and observations, in the same way that mathematicians arrive at the solution of a problem by the simple arrangement of data, and by reducing reasoning to simple operations, to judgments so brief that they never lose sight of the evidence which serves as their guide.*

Albert Einstein:

Mein Weltbild, Kapitel: *Zur Methodik der theoretischen Physik*:

Durch bloßes logisches Denken vermögen wir keinerlei Wissen über die Erfahrungswelt zu erlangen; alles Wissen über die Wirklichkeit geht von der Erfahrung aus und mündet in ihr. Rein logisch gewonnene Sätze sind mit Rücksicht auf das Reale völlig leer.

*Uitspraken, verkregen door **pure logica**, zijn met betrekking tot de werkelijkheid **volkomen leeg**.*

ON THE METHOD OF THEORETICAL PHYSICS

The Herbert Spencer lecture, delivered at Oxford, June 10, 1933.

Published in Mein Weltbild, Amsterdam: Querida Verlag, 1934.

Pure logical thinking cannot yield us any knowledge of the empirical world; all knowledge of reality starts from experience and ends in it. Propositions arrived at by purely logical means are completely empty as regards reality.

W.r.t. reality, propositions obtained by pure logic are meaningless.

C r i t i k
der
reinen Vernunft



von
Immanuel Kant
Professor in Königsberg.



N i g a,
verlegt Johann Friedrich Hartknoch
1 7 8 1.

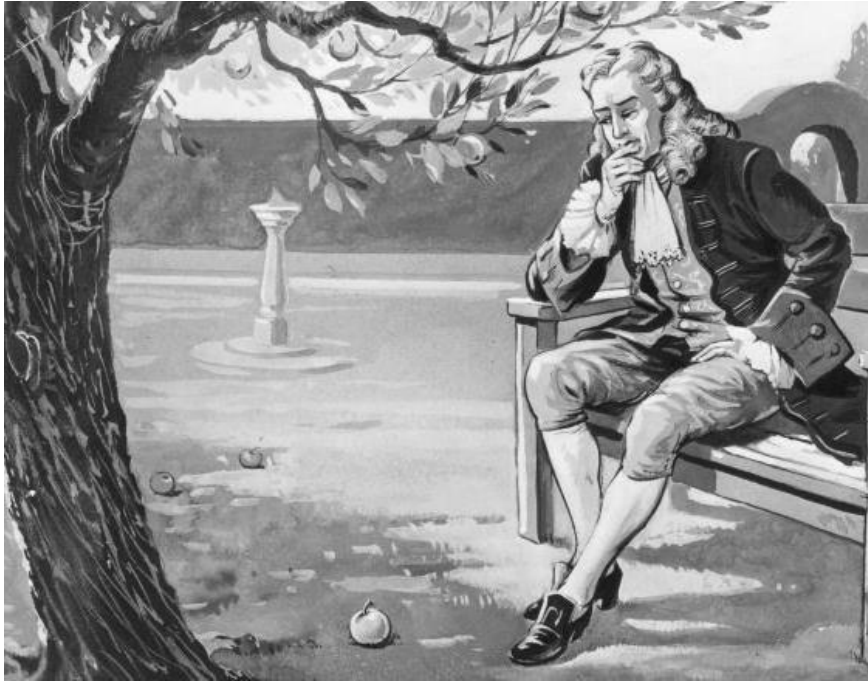
Albert Einstein:
**Rein logisch gewonnene Sätze
sind mit Rücksicht auf das Reale
völlig leer.**

**Propositions obtained by pure logic
are, with respect to reality,
completely empty.**

Immanuel Kant
already said the same in his
Critik der reinen Vernunft (1781)
(Critique of pure reason).

*HR: but that whole work seems
— like all of philosophy —
an example of pure reasoning...*

Deriving from observed phenomena without fabricating assumptions:



Hmm, it didn't move before it fell, so this was a change of movement, which according to my 2nd law requires a force that is proportional to its mass in the direction of this change of movement. It fell perpendicularly, right towards the centre of the earth, so it must be that the earth pulled it. But if the earth pulls an apple, it also pulls the moon, thus keeping it in its orbit. Both the moon and the apple should then pull the

earth too, & that force must be proportional to the mass of the earth, so the mutual force must be proportional to both masses. As it spreads in all directions it must decline how a sphere's surface grows, hence it must be reciprocally proportional to the square of their mutual distance: $F = G Mm/r^2$.

Conform page 15 of "Memoirs of Sir Isaac Newtons life" by William Stukeley, 1752.

Albert Einstein:

Zur Elektrodynamik bewegter Körper.
On the electrodynamics of moving bodies.

Annalen der Physik, 17 (1905), 891–921:

Wir setzen noch der Erfahrung gemäß fest, daß die Größe

$$\frac{2 \overline{AB}}{t'_A - t_A} = V$$

eine universelle Konstante (die Lichtgeschwindigkeit im leeren Raume) sei.

*We further establish in agreement with **experience**, that the speed of light in empty space be a universal constant.*

*He did **not** try to **explain** M&M's result with an **assumption**, but **used** it as a **truth** from which he drew a **conclusion**; "**if we always measure the same value, then it must be a constant**".*

Albert Einstein:

Über das Relativitätsprinzip und die
aus demselben gezogenen Folgerungen.

On the relativity principle and the conclusions drawn from it.

Jahrbuch für Radioaktivität und Elektronik, 4 (1907), 411-462:

Es ist bekannt, daß jener Widerspruch zwischen Theorie und Experiment durch die Annahme von H. A. Lorentz und Fitzgerald, nach welcher bewegte Körper in der Richtung ihrer Bewegung eine bestimmte Kontraktion erfahren, formell beseitigt wurde. Diese ad hoc eingeführte Annahme erschien aber doch nur als ein künstliches Mittel, um die Theorie zu retten;

Deze ad hoc ingevoerde aanname verscheen toch
echter slechts als een kunstgreep om de theorie te redden.

*This ad hoc introduced assumption appeared
however only as an artificial means to save the theory.*

Albert Einstein:

Grundgedanken und Methoden der Relativitätstheorie,
in ihrer Entwicklung dargestellt.

Fundamental ideas and methods of the theory of relativity,
presented in their development. (after 1920-01-22):

Als ich (i. J. 1907) mit einer zusammenfassenden Arbeit über die spezielle Relativitätstheorie für das „Jahrbuch für Radioaktivität und Elektronik“ beschäftigt war,^[35] da musste ich auch versuchen, die Newton'sche Gravitationstheorie so zu modifizieren, dass ihre Gesetze in die Theorie hineinpassten. In dieser Richtung unternommene Versuche zeigten zwar die Durchführbarkeit dieses Unternehmens, befriedigten mich aber nicht, weil sie auf physikalisch unbegründete Hypothesen gestützt werden mussten. Da kam mir der glücklichste Gedanke meines Lebens

*Although attempts in this direction showed the feasibility of this enterprise, they did **not satisfy** me, because they had to be based upon **physically unfounded hypotheses**¹.*

^{1a}: If unfounded, I would prefer *assumption* instead of the more dignified word *hypothesis*.

^b: "official" translation *erroneously* says: *unfounded physical hypotheses*.

Isaacus Newtonus:
**Fieri debet ne argumentum inductionis
tollatur per hypotheses.**

Reg. Phil. IV.

Hendrikus Reintsus:
**Thou shalt not come up with
fabrications that contradict
conclusions from facts,
crotcheteer!**

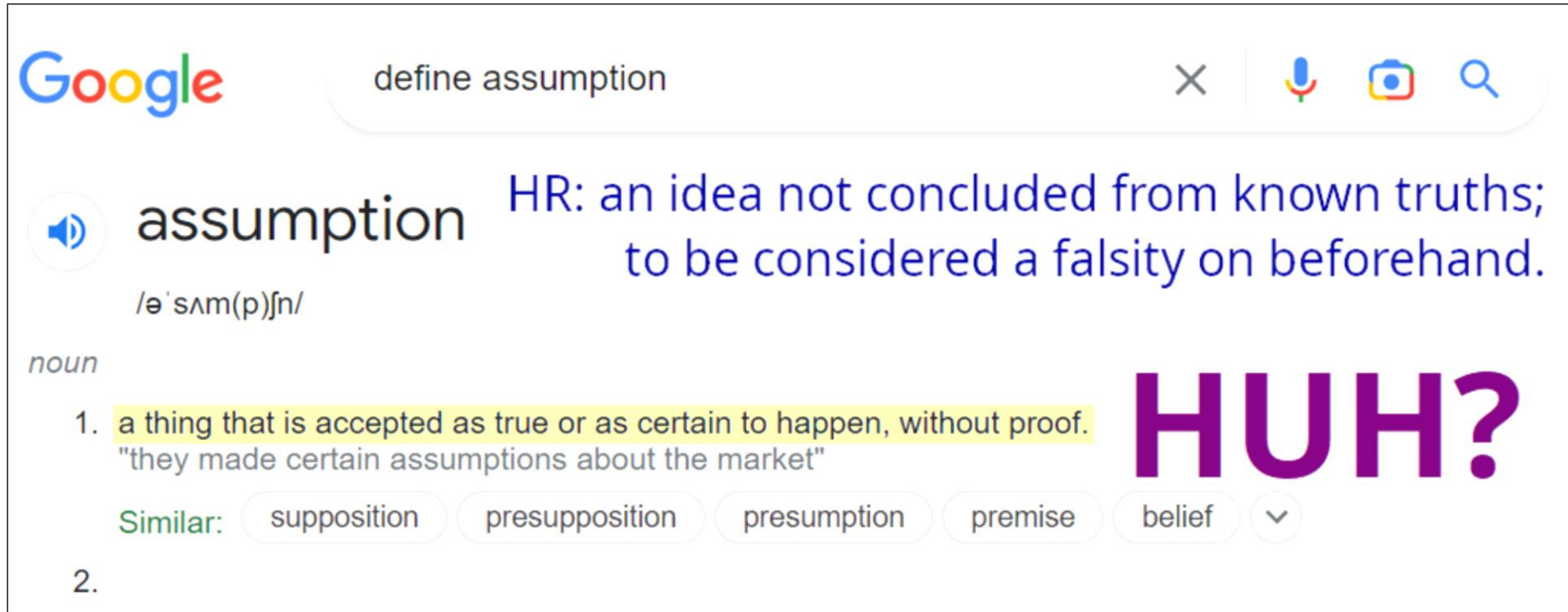
Henk Reints:

Always ask yourself:

Can I derive this from facts?

DO NOT make ANY assumptions at all!
At least not as a fundamental premise.

They explain completely nothing,
but lead you astray!



Google

define assumption

assumption

HR: an idea not concluded from known truths; to be considered a falsity on beforehand.

/ə'sʌm(p)ʃn/

noun

1. a thing that is accepted as true or as certain to happen, without proof. "they made certain assumptions about the market"

Similar: supposition presupposition presumption premise belief

2.

HUH?

