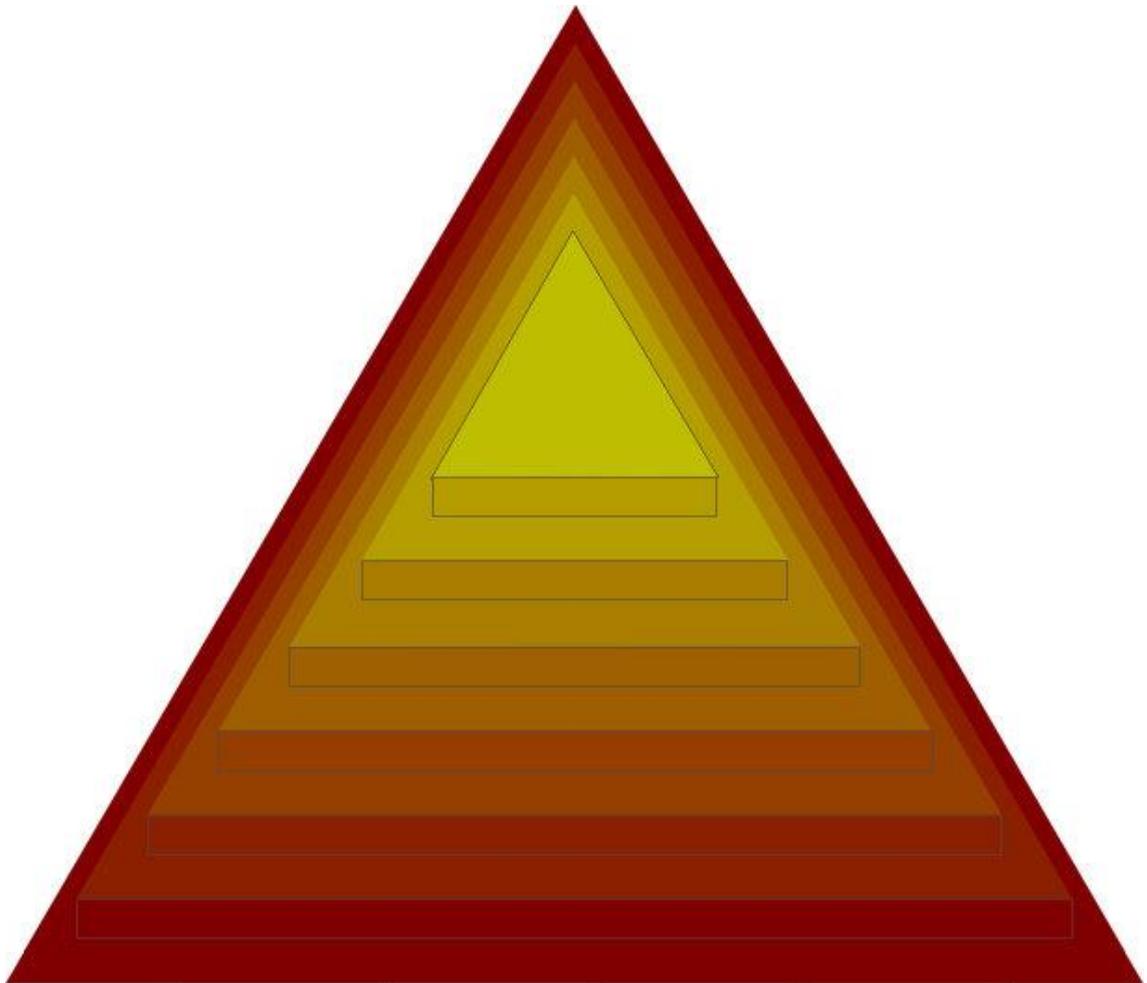


Design

beyond probability



Taeke M. de Jong 20200311

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"De gewoonten der menschen is zodanig, dat zy, zo dikwijls als zy enige gelijkheit tusschen twee dingen bemerken, van beide het geen oordeelen, 't welk zy van een van beide waar hebben bevonden, zelfs hier in, daar in zy verscheiden zijn." ^a

People have the habit, as soon as they recognize any equality between two things, to suppose that equality in everything in which those things differ.

"Er is geen ander zijn dan anders zijn"^b

There is no other being than being different.

^a Descartes(1684)Regulae ad directionem ingenii Regulen van de bestieringe des verstants(Den Haag 1966)Nijhoff
^b Bruggen(1924)De grondgedachte van Prometheus(Amsterdam)Maatschappij voor goede en goedkoope lectuur

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§ 5 THALES CONDITIONED DISTINCTION, REDUCTION AND GENERALISATION

Western philosophy was born around 600 BC in Milete, a Greek colony with more than 80 own colonies. There, caravan goods were shipped from the east to the west.



Fig. 7 Greek colonies^a



Fig. 8 Meandermouth now silted^b



Fig. 9 Milete now



Fig. 10 Excavations^c

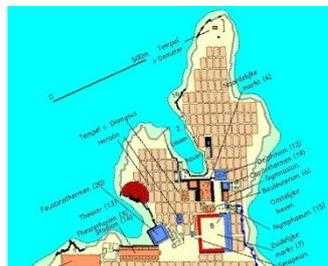


Fig. 11

Milete -450(as it was rebuilt over a century after Thales)^d

Trade with other cultures puts your own traditions in perspective. Gods appear to be local. You may *believe* that they make stars and planets move, but for navigation at sea to *know how* they move is a more useful belief. 'True' is what works for pragmatists.

The Greek mainland, its more than 600 islands and 160 colonies were separated by water, but connected by the Greek language. The Olympics made the mutual competition into a community game playing the enemy instead of practicing enmity.

Because of the simplicity of the Greek language and its alphabet, many Greeks were able to read and write. So that art was not the monopoly of priests who, based on inaccessible holy writings, could guard the true religion centrally, as elsewhere.

a Times History Atlas of the World

b <https://en.wikipedia.org/wiki/Miletus>

c <https://www.ruhr-uni-bochum.de/milet/in/topo.htm>

d <https://www.stilus.nl/oudheid/wdo/GEO/M/MILETE.html> and Pergamom Museum Berlijn

2 SCIENCE SUPPOSES A PHILOSOPHIC DESIGN

No island or city-state therefore had sole rights to one surviving truth, although mother city Athens still had some orthodox pretensions towards its children. Greek Gods operated locally, although they met at the Olympus. They could also deceive each other and argue.

Greek was also the first language to have a certain article (the, it) and a verb 'to be'. Greeks could therefore discuss 'being' and 'bravery' as an independent object, sometimes even as a god or goddess such as 'Virtue' (Aretè) or 'Wisdom' (Athene).

Thales of Milete was our first Western philosopher. There are no writings left of him, but there are quotes: What is difficult?: "Knowing oneself." What is easy? "Giving advice." How should you live a good and just life? "Avoid what you blame others." Kant's categorical imperative was 2400 years later not much further.

Thales, the first of the Greek 'Seven sages' made his name by predicting the solar eclipse of 585 BC. He also proved the usefulness of philosophy as a practical meteorologist and merchant by buying all the olive presses from Milete when everyone expected a poor harvest. That he foresaw the solar eclipse and the good harvest must not have been born from theoretical insight, but from an empirical regularity in a well-documented historical series of weather conditions.

However, he also determined the distance to a ship from the change in angle of view during a beach walk and the height of pyramids from their shadow in relation to his own shadow (according to the 'theorem of Thales'). Those are no longer historical empirical probabilities, but mathematical proofs such as Euclides would elaborate 300 years later to the geometry.^a However, this determination of height assumes parallel solar rays, and that is not self-evident due to perspective distortion.



Fig. 12 Visual deception through the perspective of sun rays ^b

a Henderson(2002)Greek mathematical works Thales to Euclid(Cambridge Mass)Loeb Harvard University Press

b Ton Wisselius <https://www.pietsweer.nl/image/zonnestralen-41/>

The sides of a road also seem to point to one point, while they are parallel. That the sun's rays are (practically) parallel is only apparent if the angle of incidence is the same everywhere on a flat surface at the same time.

Eratostenes determined 200 years later, the circumference of the earth fairly accurately, apparently from then little common assumptions such as:

- 1 practically parallel sun rays adopted by Thales,
- 2 Earth assumed by Anaximandros to be a free-floating globe.

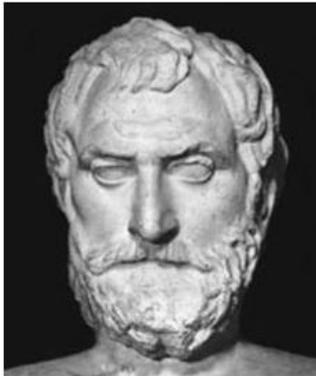


Fig. 13
Thales

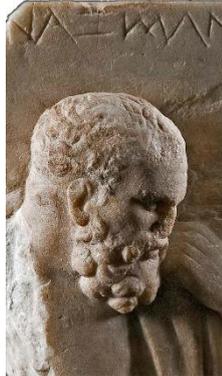


Fig. 14
Anaximandros



Fig. 15
Heraclites

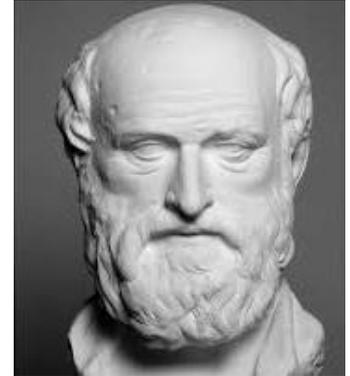


Fig. 16
Eratosthenes

If Eratostenes had assumed a flat earth, he would have had to reject the parallelism of the sun's rays from different angles at different locations and assume a sun at a foreseeable distance. Only the combination of both presuppositions led to the correct inference from that difference. The interpretation of observations stands or falls with good or wrong assumptions. Sometimes you also have to deal with unspoken assumptions, a main task for philosophy.

According to Anaximandros, a younger contemporary of Thales in Milete, the primal principle, the 'primal cause' of Being, is an indefinite 'apeiron', from which all opposites such as wet and dry would have arisen. A circle of fire would, spattered apart, revolve and new worlds would emerge and return to it. On such a floating, initially liquid, solidifying globe, organisms arose, first living in the water and only later moving to the land.

Anaximandros apparently had already rejected the idea of a flat earth. That was common because otherwise all the water would drip down from a round earth. That in itself assumes that everything falls down vertically. Apparently that too was no longer self-evident for Anaximandros.

Herakleitos ('panta rhei', 'everything flows' as Plato summarised his thought 3 centuries later) lived shortly after Anaximandros in Efese, no more than 50 km north of Milete. He regarded fire and war as a primordial cause, perhaps also as a source of energy to create the opposites in the apeiron of Anaximandros.

This is similar to Hegel's dialectic: every thesis evokes its antithesis to lead to a synthesis that evokes an antithesis on its turn. In modern physics, every particle has its

2 SCIENCE SUPPOSES A PHILOSOPHIC DESIGN

anti-particle. When they meet, they disappear with energy left behind. Herakleitos' fire then should make them appear the reverse.

Thales reduced the world to water as a primordial cause, because water has all known aggregation states (solid, liquid, gaseous). After the indefinite apeiron of Anaximandros, the later pre-Socrats presupposed more tangible "primal things," such as air, earth, water, and fire, precursors of Mendeleev's periodic system of elements (1869).

You can imagine a *will* of gods in the existing reality, and tell stories about their conflicting wishes as the cause of everything, but to change your attention into the question *how* they realize them and to reconstruct that *skill* is a big step to into a religiously independent causality.

Ahead of Aristotle, the divine 'final cause' seems to be replaced by 'material', 'formal' and 'efficient' kinds of cause, as if a presocratic Prometheus recommends the people:

- 1 present their material as combinations of primal substances,
- 2 reduce their space to points, lines and planes (geometry), and
- 3 generalize repetitions into workable concepts (words and numbers).

With those representations, reductions and generalizations you can try to simulate existing or desired reality, to design it as if you were a god. Technique is a condition for knowledge: you must be able to know before you can know. Thales was also known as an inventor, designer.

Only *after* that 'designing' you can then 'empirically' check whether that design as a hypothesis corresponds to the observed reality.

You can, however, also design and realize *deviating* realities yourself.

For that you need representation tools, similar to knives, sieves, binders. Ockham also had a 'razor' in the 14th century that resembles a statement attributed to Einstein: "Make everything as simple as possible, but not simpler than that."

§ 6 PLATOS SOPHISTIC DEBATE CONDITIONED SCIENTIFIC DOUBT

Defending trade interests in various other cultures resulted in a culture of hearing, rebuttal and judgments based on arguments so that you could separate as friends keeping trade relationships. You could learn from 'sophists' how you can be right.

The "fair debate" as it appears in a promotion and court session still contains useful sophistical rules:

1. one proposition at a time is being examined for its tenability;
2. regardless of your personal opinion, you agree who will defend the proposition (in the *role* of defender) and who will attack him (in the *role* of opponent),
3. the opponent challenges to clarify the proposition on the basis of improbable interpretations ("Do you mean by this statement, that ...?");
4. the opponent proposes a common basis ("Do you agree that?");

5. the opponent attacks by pointing out a possible contradiction between the proposition and the agreed common premise;
6. the proponent defends with an attempt to refute the assumed contradiction.

Sophists had the name to talk straight everything that is crooked, but they are the precursors of Descartes' doubt and Poppers falsifiability. According to Popper a proposition that cannot be contradicted is by definition not scientific. There is no pro and contra, no counter-learning, no control, no criticism or dialogue possible. In this sense playing Herakleitos' war in a debate is also the father of science.

Sophists didn't make a name with their own system, but with their method. The famous sophist Protagoras ("man is the measure of all things") was embarrassed ("aporia") by Socrates in Plato's dialogue 'Protagoras' when he defended that "virtue" can be taught, and that he asked money to do so.



Fig. 17
Virtue as goddess

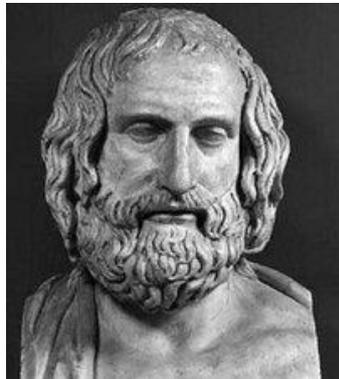


Fig. 18
Protagoras

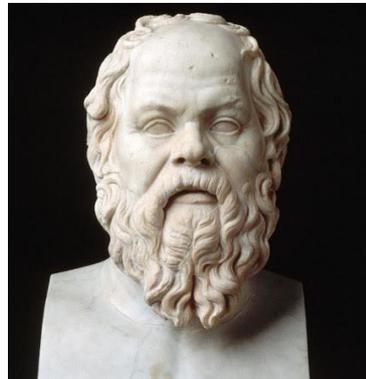


Fig. 19
Socrates



Fig. 20
Plato and Aristoteles^a

To the amusement of youthful bystanders, Socrates also embarrassed dignitaries in the street with his annoying questioning of what 'virtue' actually is. He did not leave his own writings, but his student Plato expressed his thoughts in dialogues.

As the cultural center of the Greek world, Athens remained more orthodox than its colonies, to which dissidents disappeared with their views. Socrates was convicted in Athens on charges of blasphemy and spoiling the youth. He did not flee, but chose the poison cup.

The Greek language made it possible to independentize an adjective, the property of an object (such as "wise" into "wisdom"). If you regard such words as real, independent objects (medieval "realism"), then you (like Socrates) can continue to inquire about their "essence", but every explanation ends adjectively and bound by examples. I share Poppers reluctance against such 'essentialism'^b. Words are just collective names that we have invented ourselves (medieval 'nominalism'). Similarly, I cannot possibly share Plato's view that our reality is only a projection of ideas ("idealism").

^a Detail van Rafaël Santi(1510)Stanza della Segnatura(Rome)Vaticaan
^b Popper(1976)Autobiografie(Utrecht 1978)Spectrum Aula

2 SCIENCE SUPPOSES A PHILOSOPHIC DESIGN

On the contrary, actual things project themselves in our mind, and when those impressions repeat themselves we invent words for them. The success of Plato in the Christian world is understandable when you read in the gospel of John 1: "In the beginning was the Word."

Plato's hero Socrates was, moreover, like Jesus, a martyr of his own conviction. This creates a sense of responsibility for their relatives, apparently even when it comes to pagans. Dante (1265-1321) tells in his *Divina Commedia* how the not baptized gentiles Socrates, Plato and Aristotle did not end up in Hell. They have received their own place next to Heaven.

You may reject Plato's idealistic aberrations, but he has made the dialogue of the sophists a standard of literary expression, philosophy and science. A dialogue avoids one-sidedness. Opposing views are given their own face and power of persuasion. The similarities and differences of insight per character lead to the analysis of their overlaps or mutual exclusion that lead to logical conclusion with conjunctions such as "and" or "or". Plato's student Aristotle will analyze this logic and make it a scientific discipline.

The convincing truths of mathematics as a world of ideas that can develop independent from reality and yet seems to project himself into that reality everywhere, was an important argument for the idealistic view. You can, however, also imagine mathematics as an empirical science or even technique of repetition, derived from our experience with everything that repeats itself in reality and in our representation.

Mathematics distinguishes different types of repetition, such as making equal steps (line), with equal deviation (straight or circle), with equal units counting, counting back, multiplying, integrating, and differentiating. You can make differences equal with equations. What repeats itself in the real world can be counted and numbered. Conversely, the representation of a mathematical product can again be realized in real production, repeated production.

What does not repeat, the one-time or unique cannot be counted, but only told. The unique does not lend itself to generalization and therefore not to a predictive science that relies on repetition. For that science, mathematics is the tool par excellence, a technique for simulating all types of repetition and equality.

Mathematics only assumes a difference *between* the qualities that can be counted (variables), but it supposes equality of character and size *within* those variables.

§ 7 ARISTOTELES CONDITIONED EMPIRISM AND LOGIC

Unlike Plato from Athens, his student Aristotle from Stageira ('the Stagirite') no longer assumed that you, as a midwife, only have to redeem the ideas that are still sleeping in a student in order to give birth to knowledge. Not all knowledge of the world can already be present as an idea in every student.

This was probably also apparent from the strange objects of which no one had any idea before that his pupil Alexander the Great sent him for his collection during his conquest up to the Indus. Aristotle taught to trust your own senses and to process that variety of impressions into usable knowledge using only 4 innate word categories^a and 4 forms of judgment.

Categories:	Judgment forms:
substance,	affirmative - negative,
quality,	general (\forall) - special (\exists),
quantity,	some - one-off,
relation.	necessary - possible.

Fig. 21 Aristoteles' categories and judgement forms

With different word categories: substance, quality, quantity and relation, you can form a judgment in a sentence with subject and predicate: affirmative or negative, general or special, some or one-off, necessary or possible.

From a general judgment (major \forall) and a special judgment (minor \exists) you can derive a third judgment, a conclusion (deduction)^b. A general judgement is a preliminary generalization from many examples (induction).

Deduction	Induction
Major (\forall): If I am in Delft, then I am in The Netherlands. ('D \Rightarrow N'),	Aadorp is a place in The Netherlands (\exists), Aagtdorp is a place in The Netherlands (\exists), ...
Minor (\exists) : Well, I am in Delft. ('D')	...
	Zwolle is a place in The Netherlands (\exists).
Conclusion (\exists): I am in The Netherlands. ('N')	So: All places are in The Netherlands. (\forall)

Fig. 22 Aristoteles' logics: combination of judgements

In observable reality, however, no number of observations is sufficient for 'complete induction'. If you add 'London is a place in England' to the 4000 from Aadorp to Zwolle in The Netherlands of Fig. 22, then the conclusion 'all' has already been falsified. Induction, a general judgment, therefore always deserves doubt.

In mathematics, "full induction" is accepted if you could repeat the same operation indefinitely. For example, you approach zero by repeated halving. You never reach that zero, but you can accept it as the final result of an imaginary infinitely repeated operation of halving.

At Plato, special cases came from more general ideas; for Aristotle, the general is the collection of special cases. Yet the platonic idea ('eidos' is literally 'visual form') comes silently back to Aristotle as the form in which a substance (material or content)

^a Aristoteles(-335?)Categories(Cambridge Mass1983)Loeb Harvard University Press p17 mentions 10, but the others can be traced back to these 4.
^b Aristoteles(-335?)Prior analytics I(Cambridge Mass1983)Loeb Harvard University Press p199

2 SCIENCE SUPPOSES A PHILOSOPHIC DESIGN

takes shape. The pure, substance-free form is an ideal (geometrical) idea, and any substance has some resistance to take its intended shape.

Movement is also a change of form against which any substance will resist, it is a confrontation between an ideal form and opposing substance. This resistance seems to be a precursor to Newton's mass inertia, but for Aristotle substantial resistance is the cause of all imperfection.

According to Aristotle, any movement must have an unmoved mover, the infinitely good and beautiful against which any substance resists. At Newton, not the movement itself, but only its acceleration or change of direction will have a cause. Aristotle then distinguishes four types of cause^a:

- 1 efficient cause of movement,**
what is now usually understood by "cause.";
- 2 substantial cause,**
'primal case' such as the 'water' of Thales;
- 3 form-cause,**
the perfect mold that every substance resists;
- 4 goal cause,**
a divine or human will.

Fig. 23 Aristoteles' causality

The basic concepts of Aristotle's physics are space, time, substance, cause and movement. He assumes goal directed efficiency.

Fysics	Biology	Humanistics
goal directed	entelechy: soul-steered	layered
Space	Unmoved mover, the soul	Vegetable nourishing
Time	(active form)	
Substance		Animal feeling
Cause	Moved body	
Movement	(passive substance)	Human thinking

Fig. 24 Aristoteles' fysics, biology and antropology

For his biology, the soul is the cause of form, the unmoved, focused mover. The body is the moved, but resisting substance, the tool (organon) of the soul (entelechy). The human soul has a plant-nourishing, animal-feeling and human-thinking layer.

The large series of surviving works by Aristotle has the character of an encyclopaedia that covers all knowledge at the time. That great design of Aristotelian science dominated the literate world until the end of the Middle Ages with an almost inviolable authority.

^a Aristoteles(-335?)Metaphysics I(Cambridge Mass1996)Loeb Harvard University Press p17

§ 8 CARTESIAN RATIONALITY CONDITIONED CERTAINTY BY DOUBT

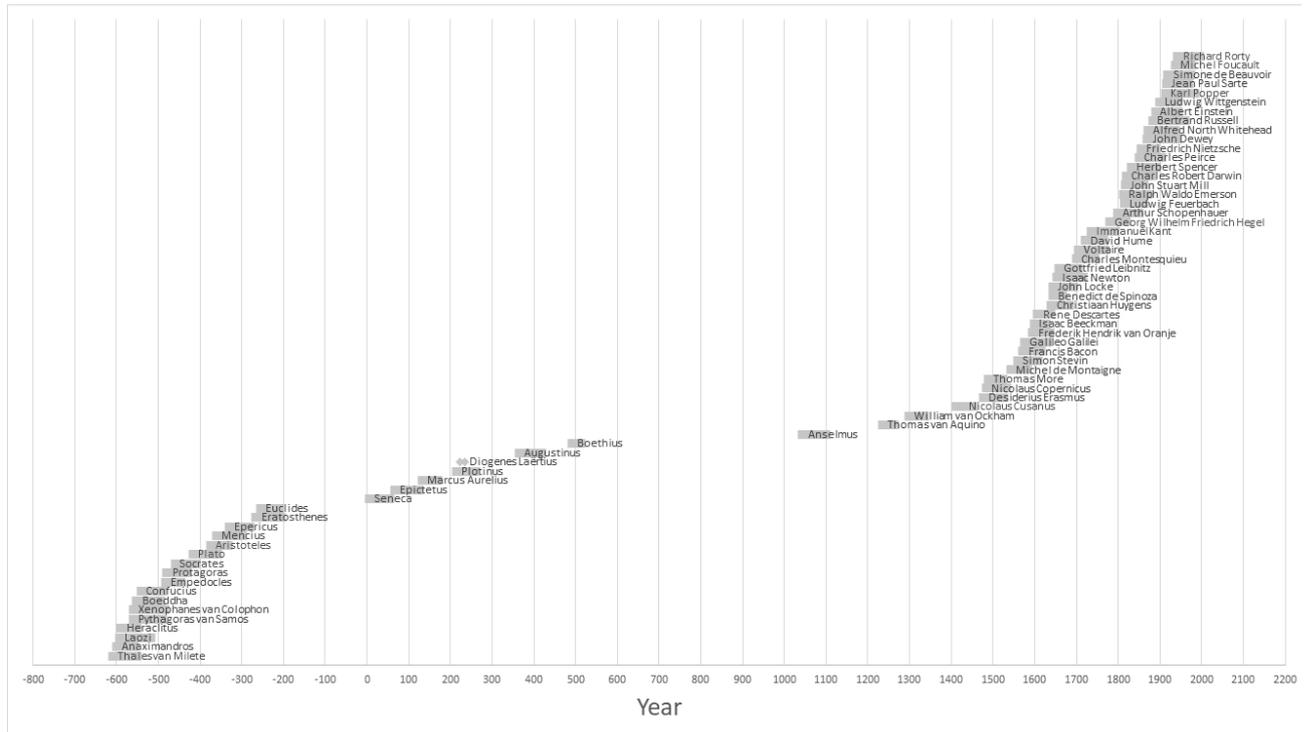


Fig. 25 Well known philosophers from Thales until Rorty in the timeline

§ 8 CARTESIAN RATIONALITY CONDITIONED CERTAINTY BY DOUBT

Descartes is considered the founder of modern philosophy, but two centuries before Descartes at the end of the Middle Ages testified Cusanus (1401-1464), a German lawyer, philosopher, mathematician, astronomer, humanist and cardinal of far-reaching modernism and tolerance^a.

The prominent role of mathematics in his work up to his theology makes him even more rational than Descartes.^b He considered all religions with unacceptable tolerance as parallel paths to the same God that you (as so many) cannot know at an infinite distance ('docta ignorantia').

He negotiated as Cardinal and Islam and Koran connoisseur on behalf of the Pope with Islam after the fall of Constantinople, shortly before the Reformation brought about the polarised extremism that Descartes had to take into account. This inventor of negative lenses for myopia, an advocate of accurate measurement and weighing, denied apparent mathematical counterparts such as straight and round ('coincidentia oppositorum') with mathematical arguments. He left Deventer a house for poor students and his birthplace Kues on the Moselle a still existing retirement home with the library of his own and other medieval manuscripts. However, he did not make school like Descartes did 200 years later.

^a Müller(2013)Die Modernitäten des Nikolaus von Kues(Mainz)Historische Kulturwissenschaften

^b Dijksterhuis(1975)De mechanisering van het wereldbeeld(Amsterdam 1980)Meulenhoff p248 provides a clear overview of Cusanus' ideas.

2 SCIENCE SUPPOSES A PHILOSOPHIC DESIGN



Fig. 26
Cusanus

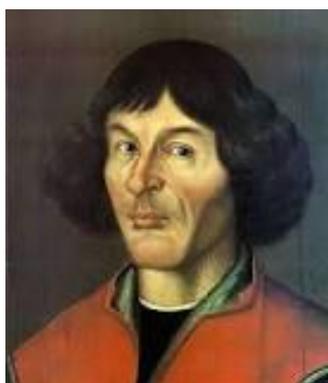


Fig. 27
Copernicus



Fig. 28
Descartes



Fig. 29
Newton

Descartes' paradox that you can derive certainty from doubt is an example of Russell's paradox: the set of all sets cannot contain itself^a. Similarly, the set of all *doubts* cannot contain itself. If you look at that collection from the outside, then *there* is no doubt about the *fact* that you doubt. Descartes' "Cogito ergo sum"^b is less convincing, if you realise: "I think, so *I think* I am". 'I am' is also a thought after all.

You cannot talk *about* concepts using the same concepts, for that you need other concepts (a meta-language). Descartes therefore advises to talk in symbols about numbers (variables). By doing so, he prepared the use of algebraic expressions.

Similarly, you cannot think about thinking with the same thoughts you think *about*. Understanding is a different idea than what must be understood. Descartes thought in other (algebraic) concepts about geometry and thereby became the inventor of analytic geometry.

The use of coordinates is Descartes' most important lasting contribution to science. He derived his prestige from the application of mathematics in his sometimes pioneering, yet immature physics, but finally, he has remained best known as the philosopher of rationalism.

Copernicus had dared to doubt Aristotle in the previous century, and Descartes joined the growing choir of those doubters. They dared to think for themselves instead of following the authorities without criticism, as Kant had to advise again two centuries later.

If you simply learn by heart what you learn, then you will not *understand* it, get a *grip* on it from *outside*, do something with it, contrast it, counter-learn, check whether it is true, doubt.

Descartes had learned practically everything there was to be learned from the Jesuits in Paris. Every idea, no matter how unlikely, had been worked out by some authority

^a As an element of a set *with all sets*, it no longer contains 'all sets'. This paradox is described in Russell (1903) *The Principles of Mathematics* (London 1996) Norton. It is remarkable that Russell (1946) *History of Western Philosophy* (Cothen 1990) Servire in his otherwise crystal clear chapter on Descartes on p588 of the Dutch version himself did not notice that this thinking about doubt is an example thereof.

^b This Latin word is also a contraction of *co-agitare* (repeatedly operate together). This shows an interesting Roman view on 'thinking'.

in the past. What can you be sure of, how should you check that? By continuing to doubt yourself (think)!

He went on a journey and found the most improbable and mutually contradictory views in other cultures. However, at the same time he had to admit that such views were shared by very sensible people, and each individual mind was able to check a mathematical proof without external authority.

Mathematics turned out to be the only area in which this individually developed certainty was finally shared by everyone as 'evident', clear and well-distinguished ('clairement et distinctement').

In the winter of 1619, Descartes, 23 years old, retired to Germany as a recluse for a few months 'in a well-heated room', asking how this mathematical evidence could also be achieved in areas other than mathematics.^a He resolved himself:

- 1 never to accept anything for authority again if you yourself have still any reason to doubt it;
- 2 to divide each problem into so many parts as possible and required to resolve it;
- 3 starting with the simplest, but also search coherences that deviate from that natural order;
- 4 making summaries and general overviews everywhere so complete that you are sure not skipping anything.

In dealing with others, however, he would have to live with uncertain beliefs and customs that he did not want to condemn before he himself was completely certain of their inaccuracy. To that end, he decided to:

- 1 obey the customs of the country, but also from your own religion and to stay in the middle of extremes;
- 2 be as determined as possible (keep course) once you have decided on views, even if you still have doubts;
- 3 conquer yourself rather than destiny; rather change your own wishes than the world order (stoic);
- 4 consider in succession the activities of people in this life in order to choose the best.

He did the latter by traveling around for nine years until he decided to settle in the Netherlands in order "to avoid all the places where I could have acquaintances and to withdraw here in a country where ...

because of the long duration of the war such an order has been created that it appears that the armies that are maintained there serve only to be able to enjoy the fruits of peace with greater security;

^a Descartes(1637)Verloog over de methode(Amsterdam1937)Wereldbibliotheek of de Bibliotheek Descartes deel 3 van Boom, Amsterdam. In the first three parts it turns out not to be a dry matter, but a very entertaining, modest autobiography with a wealth of wise examples. In the fourth part, however, it becomes less accessible and convincing metaphysics, in the fifth part an outdated description of biological facts as proof of the inanimate mechanics of the body and the animal as a machine, and in the sixth part the explanation why he did not dare to publish parts earlier in detail in view of the then recent conviction of Galilei.

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and where amid the crowd of a very active people who are more concerned about their own affairs than curious about those of others, without missing the comforts found in the most visited cities,

I have been able to live as lonely and withdrawn as in the most remote deserts. "

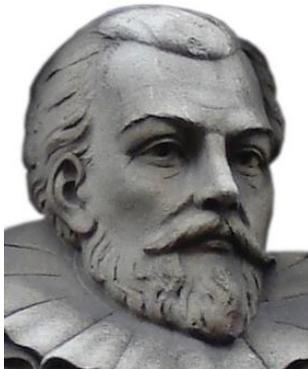


Fig. 30 Simon Stevin



Fig. 31 Frederik Hendrik van Oranje



Fig. 32 Baruch de Spinoza



Fig. 33 Christiaan Huygens

However, it was also the land of Simon Stevin (who was ahead of Galilei but wrote Dutch), of his friend Beeckman who was ahead of Newton, where princes of Orange guarded tolerance and took it twice for him, where the microscope was invented and telescope with which Galilei had discovered the moons of Jupiter in 1610, where Spinoza grinded lenses and worked out his Ethics mathematically, where Christiaan Huygens admired and corrected him.^a

In the Netherlands, he designed a metaphysical world view based on two evidences:

- 1 Individual doubt proves that you think that you exist as a thinking being, and that you can distinguish 'whether or not' in all parts of that existence.
- 2 The doubt and the representation of what does not, not yet or no longer belongs to your existence, awakens the awareness of your own imperfection.
That implies a sense of a comprehensive perfection outside of you, his "proof" of the existence of God.

How these two 'evidences' lead to his idea of a complete separation between immortal spirit and mortal body (cartesian dualism) is beyond me. That distraction does not excel in rationality. The small, doubting, imperfect, thinking ego is in Descartes's view in contrast with the great, perfect certainty of God's spirit. Science is the individual *pursuit* into that comprehensive certainty. If that doubt and the ensuing certainty is "mind," where does the "matter" that we perceive come from? Is that a divine conception ('creation') that moves along (co-agitates) with the divine thought as a world soul (aristotelian entelechy)?

If that bound matter has a substance other than the free spirit, how can the spirit take hold of our body? Spinoza soon rejected that dualism. Now that we have learned

^a Dijksterhuis(1975)De mechanisering van het wereldbeeld(Amsterdam 1980)Meulenhoff

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machines to doubt with switches (transistors) and finally even to think, that debate seems to me over.^a

Descartes' rules for the mind seem more important to science than his metaphysics. From 1620 he wrote the 'Regulen van de bestieringe des Verstants' but never published them himself. The manuscripts were left with Princess Christina after his death in Stockholm in 1650. They only appeared in 1684 after many wanderings (involving Huygens and Leibniz)^b for the first time in Dutch and only in 1701 in Latin.

The first sentence made the biggest impression on me:

" People, as soon as they recognize any equality between two things, have the habit to suppose that equality in everything even in which those things differ."

This puts a bomb under the usual statistics on heterogeneous sets such as people in medical science and biology. You cannot apply a conclusion about one equality between objects to those objects if they may differ in other characteristics.

Leibnitz is the first to distinguish, apart from the truth, the modality of possible worlds that is crucial for designers, but further he follows Descartes. They share the view that we can go back to the experience of untouchable or self-evident truths.

"The fundamental likeness between Leibniz and Descartes is in the conception that we can go back into experience until we come to unassailable or self-evident truths; and the manner in which these truths are conceived is alike in both, although Leibniz makes the distinction between *verites eternelles (a priori)* and *verites de fait (a posteriori)*." more clearly than Descartes.^c Kant will elaborate this distinction further.



Fig. 34 Leibnitz



Fig. 35 Hume



Fig. 36 Kant

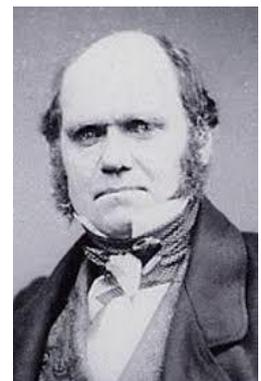


Fig. 37 Darwin

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After Hume, empiricism seemed to have replaced idealism finally: back to the facts,

a Sjoerd Zwart taps my fingers here: "The debate about dualism is not closed in the philosophy of mind. Popper, for example, has advocated it with Eccles (famous neurosurgeon) in 'The self and Its Brain' (1977)."

b Descartes(1684)Regulae ad directionem ingenii Regulen van de bestieringe des verstants(Den Haag 1966)Nijhoff, or published in more intelligible Dutch in the Descartes library part 1 of Boom, Amsterdam in 2010.

c Delisle Burns(1916)Leibniz and Descartes(The Monist Oxford University Press)October 26 4 p525-526
https://www.jstor.org/stable/27900608?seq=1#metadata_info_tab_contents

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first look for yourself, no categories and assumptions in advance! Even a causal relationship is a mental assumption. The senses only observe a *sequence* of events. The mind reduces the infinite variety of impressions in manageable generalizations. Difference is the language of the senses, equality is the language of the mind.

Still, Kant gave idealism a place back in science with 26 a priori ideas in his still popular and highly cited science design. Next to ideas of space and time located in the senses, our mind then contains 24 ideas in its reason.

	Categories	Kinds of judgement
1 Quantity	Unit Multiplicity Allness	General Special Singular
2 Quality	Reality Negation Constraint	Affirmative Denying Infinite
3 Relationship	of inherence and subsistence (substantia et accidens) of causality and dependence (cause and effect) of community (interaction between active and passive)	Categorical Hypothetical Disjunctive
4 Modality	Possibility, Impossibility Existence, non-existence Necessity, Coincidence	Problematic Assertory Apodictic

Fig. 38 24 A priori categories and kinds of judgment according to Kant ^a

These ideas would be necessary to make 'knowledge' possible. That 26 is already much less than what Plato assumed as present in everyone's mind from past lives, but again more than the 8 of Aristotle.

According to Kant an intellectual 'judgment' attaches a 'property' in one or another 'category' of Fig. 38 to an 'object'. However, to do so you need also an ability to judge (to choose an appropriate adjective for a given noun), apart from senses and reason. Moreover, an overarching 'reason' from self-chosen ideas and principles must determine what is 'appropriate'.

The multitude of instances in our head also form a unity: the subject (for example 'I'). That unity of the subject is always a crucial assumption in Kant's 'proofs'. With schizophrenics, however, the subject can also be a multitude.^b It shows that this 'unity' can be missing, and is therefore not a priori present. This own identity must be learned from a multitude of possibilities and held fast, just so as not to be fooled by others (Foucault's field). If you were alone in the world, you didn't have to be recognizable and credible, and then you didn't need that unity.

After Darwin, how should you believe that once an animal has suddenly become an intelligent person with coincidentally 26 mutations and the implementation of all these

^a Kant(1787)Kritiek van de zuivere rede I§9, §10(Amsterdam 2004)Boom p161, 168

^b Foucault will oppose that idea of unity in an individual. Minsky also assumes a multitude of individual judgmental actors within one individual in the very readable and even exciting: Minsky(1985)The Society Of Mind(NewYork 1988)Simon Schuster

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traits simultaneously? I think that all of this was learned retrospectively, a posteriori, in childhood.^a

Philosophy lost scientific relevance in the maze of Kant. His kinds of judgement and word categories may be philosophically interesting and useful to be distinguished, but there are many overlaps and hidden suppositions making their 'a priori' into an uncontrollable and unnessecary complex starting point.

Science went its own truth-finding way with well-defined objects, operations, experiments, *reliable* observation and *valid* reasoning. Philosophy and science both lost the view on possibility-finding, design. Perhaps took the common concept of 'valid reasoning', the common *logic* that view away. Let me investigate that first in the next chapter.

^a The experiments with children who are summarized in a series of publications in Piaget (1966) *La psychologie de l'enfant* (Paris) Presses universitaires de France can be interpreted in this way, even though Piaget claims to be a Kantian.