Robert Morritt

ORIGINS AND IDEAS OF THOUGHT

Thoughts and Theories of Classical Thinkers

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INTRODUCTION

For years many of us have wondered where many ideas originated.

Here we take a look at the thinkers (Descarte who in his work on 'dualism' who was the first to clearly identify the mind with consciousness and self-awareness and to distinguish this from the brain, which was the seat of intelligence. It is fascinating to see how complex theories and interesting ideas were being formulated and postulated at such an early period.

In more recent times (archaically speaking) we look at how dualism, attributed to René Descartes (1641), postulated that the mind is a nonphysical substance. Descartes was the first to clearly identify the mind with consciousness and self-awareness and to distinguish this from the brain, which was the seat of intelligence.

We take a journey with the Argonauts described by Appolonius Rhodius who was a librarian in Alexandria. His version depicts an interesting Colchian landfall for these Greek mariners.

'The battle of Marathon' is featured within the work of Herodotus in his work 'Erato',

We consider the theory of Forms as outlined by both Aristotle and Plato.. Included is an overview of Anaxagoras and Thales study of Matter and Mass . The sayings of Xenophanes, Meditation and a study of the mind and how to improve memory of visual objects by Simonides of Ceos

For the theorists among us; a look at quantum decoherence and causal interaction and wave function which appears to originate initially in a superposition of different eigenstates, the processes by which quantum systems appear to evolve in time.

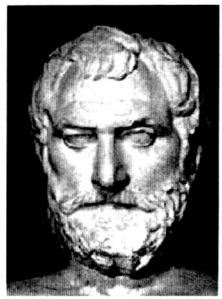
Dreams are explained and a little look at Cicero's 'Somnium'.The Dream of Scipio written by Cicero, describes a dream vision of the Roman general Scipio Aemilianus, before he commanded at the destruction of Carthage in 146 BCE.

Finally, chronologically speaking, included is the essential John Locke, a much-condensed version of his 'works [1] his thoughts and observations.his thoughts regarding the nature of knowledge, the basis of human conduct and the relationship between the mind and the body.

[1] (which to give proper justice to, would normally take a few volumes to present)

Robert D. Morritt

Thales



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Thales lived around the mid 620s – mid 540s BC and was born in the city of Miletus. Miletus was an ancient Greek Ionian city on the western coast of Asia Minor (in what is today the Aydin Province of Turkey).

The dates of Thales' life are not known precisely. The time of his life is roughly established by a few dateable events mentioned in the sources and an estimate of his length of life. According to Herodotus, Thales once predicted a solar eclipse which has been determined by modern methods to have been on May 28, 585 BC. Diogenes Laërtius quotes the chronicle of Apollodorus as saying that Thales died at 78 in the 58th Olympiad (548–545), and Sosicrates as reporting that he was 90 at his death.

As mentioned, according to tradition, Thales was born in Miletus, Asia Minor. Diogenes Laertius states that ("according to Herodotus and Douris and Democritus") his parents were Examyes and Cleobuline, Phoenician nobles. Giving another opinion, he ultimately connects Thales' family line back to Phoenician prince Cadmus. Diogenes also reports two other stories, one that he married and had a son, Cybisthus or Cybisthon, or adopted his nephew of the same name. The second is that he never married, telling his mother as a young man that it was too early to marry, and as an older man that it was too late. A much earlier source.

Plutarch - tells the following story: Solon who visited Thales asked him the reason which kept him single. Thales answered that he did not like the idea of having to worry about children. Nevertheless, several years later Thales, anxious for family, adopted his nephew Cybisthus.

Thales involved himself in many activities, taking the role of an innovator. Some say that he left no writings, others that he wrote "On the Solstice" and "On the Equinox". Neither has survived. Diogenes Laërtius quotes letters of Thales to Pherecydes and Solon, offering to review the book of the former on religion, and offering to keep company with the latter on his sojourn from Athens. Thales identifies the Milesians as Athenians.

The Lydians were at war with the Medes, a remnant of the first wave of Persians in the region, over the issue of refuge the Lydians had given to some Scythian soldiers of fortune inimical to the Medes. The war endured for five years, but in the sixth an eclipse of the Sun spontaneously halted a battle in progress (the Battle of Halys).

It seems that Thales had predicted the solar eclipse. The Seven Sages were most likely already in existence, as Croesus was also heavily influenced by Solon of Athens, another sage. Whether Thales was present at the battle is not known, nor are the exact terms of the prediction, but based on it the Lydians and Medes made peace immediately, swearing a blood oath.

Diogenes Laertius tells us that the Seven Sages were created in the archonship of Damasius at Athens about 582 BC and that Thales was the first sage. The same story, however, asserts that Thales emigrated to Miletus. There is also a report that he did not become a student of nature until after his political career. Much as we would like to have a date on the seven sages, we must reject these stories and the tempting date if we are to believe that Thales was a native of Miletus, predicted the eclipse, and was with Croesus in the campaign against Cyrus.

Thales had instruction from Egyptian priests, we are told. It was fairly certain that he came from a wealthy and established family, and the wealthy customarily educated their children. Moreover, the ordinary citizen, unless he was a seafaring man or a merchant, could not afford the grand tour in Egypt, and in any case did not consort with noble lawmakers such as Solon.

Theories

The Greeks often invoked idiosyncratic explanations of natural phenomena by reference to the will of anthropomorphic gods and heroes. Thales, however, aimed to explain natural phenomena via a rational explanation that referenced natural processes themselves.

For example, Thales attempted to explain earthquakes by hypothesizing that the Earth floats on water, and that earthquakes occur when the Earth is rocked by waves, rather than assuming that earthquakes were the result of supernatural processes.

Thales was a Hylozoist(those who think matter is alive). It is unclear whether the interpretation that he treated matter as being alive might have been mistaken for his thinking the properties of nature arise directly from material processes, more consistent with modern ideas of how properties arise as emergent characteristics of complex systems involved in the processes of evolution and developmental change.

Thales, according to Aristotle, asked what was the nature (Greek *Arche*) of the object so that it would behave in its characteristic way. Physis (φύσις) comes from phyein (φύειν), "to grow", related to our word "be".*(G)natura* is the way a thing is "born",again with the stamp of what it is in itself.

Aristotle characterizes most of the philosophers "at first" (πρῶτον) as thinking that the "principles in the form of matter were the only principles of all things", where "principle" is arche, "matter" is hyle ("wood" or "matter", "material") and "form" is eidos. *Arche* is translated as "principle", but the two words do not have precisely the same meaning. A principle of something is merely prior (related to pro-) to it either chronologically or logically. An arche (from αρχειν, "to rule") dominates an object in some way. If the arche is taken to be an origin, then specific causality is implied; that is, B is supposed to be characteristically B just because it comes from A, which dominates it.

The archai that Aristotle had in mind in his well-known passage on the first Greek scientists are not necessarily chronologically prior to their objects, but are constituents of it. For example, in pluralism objects are composed of earth, air, fire and water, but those elements do not disappear with the production of the object. They remain as archai within it, as do the atoms of the atomists.

What Aristotle is really saying is that the first philosophers were trying to define the substance(s) of which all material objects are composed. As a matter of fact, that is exactly what modern scientists are attempting to accomplish in nuclear physics, which is a second reason why Thales is described as the first western scientist.

Water as a first principle

Thales' most famous belief was his cosmological thesis, which held that the world started from water. Aristotle considered this belief roughly equivalent to the later ideas of Anaximenes, who held that everything in the world was composed of air.
The best explanation of Thales' view is the following passage from Aristotle's *Metaphysics*. The passage contains words from the theory of matter and form that were adopted by science with quite different meanings.

"That from which is everything that exists and from which it first becomes and into which it is rendered at last, its substance remaining under it, but transforming in qualities, that they say is the element and principle of things that are.":

"For it is necessary that there be some nature (φύσις), either one or more than one, from which become the other things of the object being saved... Thales the founder of this type of philosophy says that it is water."

Aristotle's depiction of the problem of change and the definition of substance is clear. If an object changes, is it the same or different? In either case how can there be a change from one to the other? The answer is that the substance "is saved", but acquires or loses different qualities (πάθη, the things you "experience").

A deeper dip into the waters of the theory of matter and form is properly reserved to other articles. The question for this article is, how far does Aristotle reflect Thales? He was probably not far off, and Thales was probably an incipient matter-and-formist.
The essentially non-philosophic Diogenes Laertius states that Thales taught as follows: "Water constituted (□πεστήσατο, 'stood under') the principle of all things."
Heraclitus Homericus states that Thales drew his conclusion from seeing moist substance turn into air, slime and earth. It seems likely that Thales viewed the Earth as solidifying from the water on which it floated and which surrounded Ocean.[citation needed]

Thales applied his method to objects that changed to become other objects, such as water into earth (he thought). But what about the changing itself? Thales did address the topic, approaching it through lodestone and amber, which, when electrified by rubbing together, also attracts. A concern for magnetism and electrification never left science, being a major part of it today. Even the subatomic particle of electric current is derived from the Greek word ήλεκτρον (ēlektron), which means "amber".

Beliefs in divinity

How was the power to move other things without the movers changing to be explained? Thales saw a commonality with the powers of living things to act. The lodestone and the amber must be alive, and if that were so, there could be no difference between the living and the dead. When asked why he didn't die if there was no difference, he replied "because there is no difference."

Aristotle defined the soul as the principle of life, that which imbues the matter and makes it live, giving it the animation, or power to act. The idea did not originate with him, as the Greeks in general believed in the distinction between mind and matter, which was ultimately to lead to a distinction not only between body and soul but also between matter and energy.

If things were alive, they must have souls. This belief was no innovation, as the ordinary ancient populations of the Mediterranean did believe that natural actions were caused by divinities. Accordingly, the sources say that Thales believed that "all things were full of gods.". In their zeal to make him the first in everything some said he was the first to hold the belief, which must have been widely known to be false. However, Thales was looking for something more general, a universal substance of mind. That also was in the polytheism of the times. Zeus was the very personification of supreme mind, dominating all the subordinate manifestations.

From Thales on, however, philosophers had a tendency to depersonify or objectify mind, as though it were the substance of animation per se and not actually a god like the other gods. The end result was a total removal of mind from substance, opening the door to a non-divine principle of action. This tradition persisted until Einstein, whose cosmology is quite a different one and does not distinguish between matter and energy.

Classical thought, however, had proceeded only a little way along that path. Instead of referring to the person, Zeus, they talked about the great mind:
"Thales", says Cicero,"assures that *water* is the principle of all things; and that God is that Mind which shaped and created all things from water."

The universal mind appears as a Roman belief in Virgil as well:
"In the beginning, SPIRIT within (spiritus intus) strengthens Heaven and Earth,
The watery fields, and the lucid globe of Luna, and then --
Titan stars; and mind (mens) infused through the limbs
Agitates the whole mass, and mixes itself with GREAT MATTER (magno corpore)"

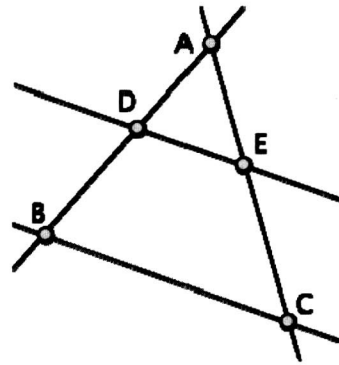
Thales was known for his innovative use of geometry. His understanding was theoretical as well as practical. For example, he said: Megiston topos: hapanta gar chorei (Μέγιστον τόπος· άπαντα γαρ χωρεί) "Space is the greatest thing, as it contains all things"

Topos is in Newtonian-style space, since the verb, chorei, has the connotation of yielding before things, or spreading out to make room for them, which is Template:Extension (metaphysics). Within this extension, things have a position. Points, lines, planes and solids related by distances and angles follow from this presumption.

Thales understood similar triangles and right triangles, and what is more, used that knowledge in practical ways. It was said that he measured the height of the pyramids by their shadows at the moment when his own shadow was equal to his height. A right triangle with two equal legs is a 45-degree right triangle, all of which are similar. The length of the pyramid's shadow measured from the center of the pyramid at that moment must have been equal to its height.

This story indicates that he was familiar with the Egyptian seked, or seqed - the ratio of the run to the rise of a slope (cotangent). The seked is at the base of problems 56, 57, 58, 59 and 60 of the Rhind papyrus - an ancient Egyptian mathematics document.
Our cotangents require the same units for run and rise, but the papyrus uses cubits for rise and palms for run, resulting in different (but still characteristic) numbers. Since there were 7 palms in a cubit, the seked was 7 times the cotangent.

THALES THEORUM



$$\therefore \frac{DE}{BC} = \frac{AE}{AC} = \frac{AD}{AB}$$

The **intercept theorem**, also known as **Thales' theorem** (not to be confused with another theorem with that name), is an important theorem in elementary geometry about the ratios of various line segments, that are created if 2 intersecting lines are intercepted by a pair of parallels. It is equivalent to the theorem about ratios in similar triangles. Traditionally it is attributed to Greek mathematician Thales.

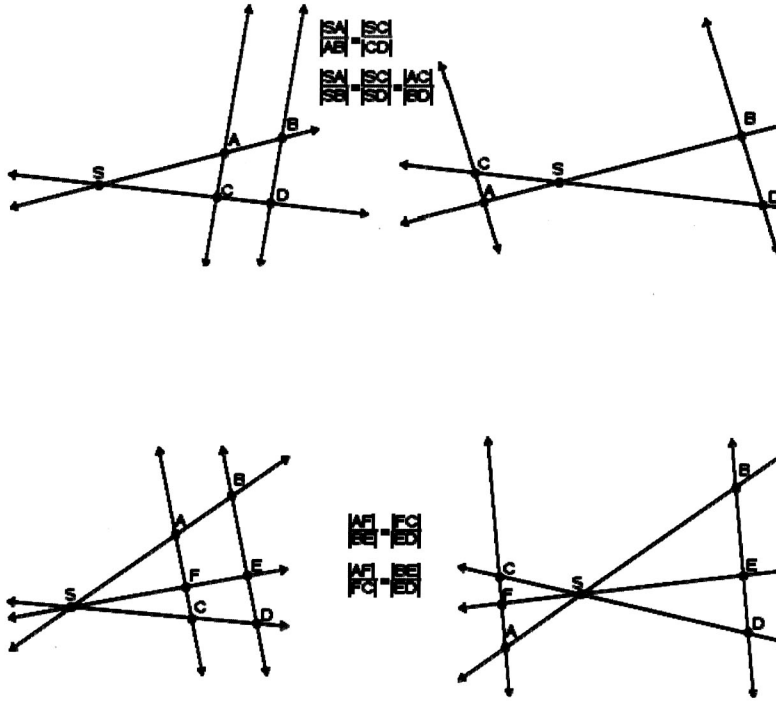
To use an example often quoted in modern reference works, suppose the base of a pyramid is 140 cubits and the angle of rise 5.25 seked. The Egyptians expressed their fractions as the sum of fractions, but the decimals are sufficient for the example. What is the rise in cubits? The run is 70 cubits, 490 palms. X, the rise, is 490 divided by 5.25 or 93 1/3 cubits. These figures sufficed for the Egyptians and Thales. We would go on to calculate the cotangent as 70 divided by 93 1/3 to get 3/4 or .75 and looking that up in a table of cotangents find that the angle of rise is a few minutes over 53 degrees.

Formulation

S is the intersection point of 2 lines and A, B are the intersections of the first line with the 2 parallels, such that B is further away from S than A, and similarly C, D are the intersections of the second line with the 2 parallels such that D is further away from S than C.

1. The ratios of any 2 segments on the first line equals the ratios of the according segments on the second line: $| SA | : | AB | = | SC | : | CD |$, $| SB | : | AB | = | SD | : | CD |$, $| SA | : | SB | = | SC | : | SD |$
2. The ratio of the 2 segments on the same line starting at S equals the ratio of the segments on the parallels: $| SA | : | SB | = | SC | : | SD | = | AC | : | BD |$
3. The converse of the first statement is true as well, i.e. if the 2 intersecting lines are intercepted by 2 arbitrary lines and $| SA | : | AB | = | SC | : | CD |$ holds then the 2 intercepting lines are parallel. However the converse of the second statement is not true.
4. If you have more than 2 lines intersecting in S, then ratio of the 2 segments on a parallel equals the ratio of the according segments on the other parallel.

5. **An example for the case of 3 lines is given the second graphic below.**



Related Concepts

Similarity and similar Triangles

Arranging 2 similar triangles, so that the intercept theorem can be applied

The intercept theorem is closely related to similarity. In fact it is equivalent to the concept of similar triangles,i.e. it can be used to prove the properties of similar triangles and similar triangles can be used to prove the intercept theorem. By matching identical angles you can always place 2 similar triangles in one another, so that you get the configuration in which the intercepts applies and vice versa the intercept theorem configuartion contains always 2 similar triangles.

Scalar Multiplication in Vector Spaces

In a normed vector space, the axioms concerning the scalar multiplication (in particular $\lambda \cdot (\vec{a} + \vec{b}) = \lambda \cdot \vec{a} + \lambda \cdot \vec{b}$ and $\|\lambda \vec{a}\| = |\lambda| \cdot \|\vec{a}\|$)

are assuring that the intercept theorem holds. You have

$$\frac{\|\lambda \cdot \vec{a}\|}{\|\vec{a}\|} = \frac{\|\lambda \cdot \vec{b}\|}{\|\vec{b}\|} = \frac{\|\lambda \cdot (\vec{a} + \vec{b})\|}{\|\vec{a} + \vec{b}\|} = |\lambda|$$