

# Epistemology

## A Review on Knowledge

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### Abstract

Epistemology is the branch of philosophy that is, ancient and important, one has to answer the questions like *How do we know?* and *What is knowledge?* at first in order to be able to choose a valid system that would yield to the most true statements. In this work we review epistemology and try to convince the reader that empiricism is the ultimate way, through which one can gather knowledge from the nature.

## 1 Introduction

At the core of the science there's always a simple question to be answered, the question that needs to be asked and properly investigated before any kind of scientific advancement is achieved. That is "*Why are we sure about the knowledge we have, and what is it after all?*". The boundaries of science are small to hold such a question within, since they in fact are the product of it themselves.

In this draft, I will investigate the philosophy of knowledge, or as it is commonly called "*Epistemology*". It seems to be a good place to start, since the question of the whole research lies upon the statement that *maybe* it is not possible to know everything about the universe, where we have to first define what we mean by everything. But knowledge itself is where we begin.

Epistemology, concerns itself about the problems and theories regarding knowledge. The word is derived from the Greek words *epistème* and *logos*, which together means the study of knowledge. But to even begin with such philosophy one must try to define first hand:

- What is knowledge, and what do we mean when we say that we know something?

- What is the source of knowledge, how do we gain reliable information and consider them as knowledge?
- Is absolute knowledge possible? If not, what are the limitations?[11]

The first question, seems to be a matter of definition, but an important role is being played by asking about "*What knowledge is?*". The importance of the question arises from the fact that by defining knowledge carelessly we might include falsehood with the truth. which by any good considerations, is the last thing, which one in search of knowing would intend to do. Beside that if you define knowledge in a careless manner, you get in trouble to argue for good strategies and sources, and even not be able to find true limitations of knowledge.

The second question concerns us to think about methods, with which we gain information (false or true premises) about anything. What makes a method reliable and other don't. This question includes the old fashioned problem *Why should we trust science?*, with this question I'll try to show that science, and specifically the process of experimenting is found to be the most reliable way to produce knowledge.

The last question is rather the aim of the project in front of you. This question invites the careful study of the source of knowledge to be more specific, to show if it has any boundaries, or is it an endless tunnel of ever coming knowledge. We may want to argue, or more clearly, philosophize about the topic. But the important considerations of this question comes in later drafts (or chapters depending on where you are reading this). Where we investigate the logic of the world, Computation, and mathematical view of nature and experience.

## 2 Knowledge and Justification

► **Absolute Knowledge:** The idea starts with the question, is there an absolute knowledge, and if so is it possible to gain it. Parmenide wanted the idea to be true, and for being so, he describes that knowledge should not depend upon changing observations and experiences, because it has its sole origin in the logic of rational thought; A knowledge that is to assure the experiences but at the same time, a knowledge that is given a priori and is conditioned by nothing but itself. *A Knowledge that can claim for itself absolute certainty and validity.*

Parmenide could be the first to attain the concept that

it might be possible to grasp the absolute knowledge of the world, with the vision that the phenomenal reality is merely the deceptive illusiveness of a true and unchangeable world. This hidden world, was believed to be accessible only by pure reasoning.

"Thus, the idea coagulated that true knowledge of the world could only be arrived at by following the path of rational thought,"

The weak point in the ontology of Parmenides was already pointed out by Aristotle. Instead Aristotle introduced a distinction between that which is "*actuality*" and that which might be "*potentiality*". This he ultimately raised to a point of departure for his own metaphysics, in which he differs clearly from that of the Eleates.

But as Parmenides intended the concept of *true being, that is only accessible through rational thought* was sustained. We'll turn back again after some basic investigation.[6]

► **Cognitive Success** is a term used to describe the ability of an individual to think, reason, learn, and solve problems effectively. The ability to solve problems, and find the true values to things we seek, is a complex process, requiring one's mind to adjust, learn, be creative and manipulate information in a way that is actually useful to solve a problem. But despite that, one can easily argue that if you got the wrong information, false premises and false statements. No amount of intelligent process (without considering luck) would be able to make a useful prediction, or any effective progress toward one's goal. In fact this is known as a motto in data science *Garbage in, Garbage out*. [10][3]

Therefore it is safe to say: ***By any process, of which we receive information from, we seek statements that are true.*** From here we first have to define a true statement (knowledge) which is the first question posed in the introduction.

Callout — It is worth to note that since this is the study of science, we might not consider all the possible ways one might use *knowledge*. One might know someone, know how to do something, etc... Although one can argue that these concepts are also a higher conceptions of just basic facts (one might know how to do something because he understands basic factual statements of the system and prepared a path to follow, which, because of the facts beneath, happens to reach the desired goal). We would only talk about, things we consider to be facts, in its scientific term. (i.e earth is orbiting sun.)

► **Defining Knowledge:** We have different opinion in different areas of our lives and works, we might have an opinion about who is going to be the president later this year, or if the stocks are going to be bullish or bearish next week; Although we are able to hold any opinion and belief in our mind, we might like to be able to categorize them by some

statements.[11][10]

► **Validity:** The first way to characterize an statement is the validity. It is safe to assume that we desire statements that we believe to be true. Consider the following statement:

Gravity is described by Newton's law

The statement is true. Not always but if we have an accuracy of a 1700s' scientist, it is most certainly a true statement about the gravity. I would here propose that when we talk about the validity of an statement we might like to consider how accurate are we talking. For that the statement was considered to be a true statement for centuries; Now it is considered true but only if we change a little:

In the limit of small velocities (with small accuracies)...

The validity of the statement changed over time, it might happen to any statement, for instance if you believe that it's raining outside, you might find it true or false. This is a problem, not only you might find contradiction with what you hold as a belief. But the worst is yet to come, there can be scenarios where you are evaluating an statement correctly (you might be right about the weather), but it just happens to be a lucky guess.

Certainly we would like true statements we hold, which are not evaluated true by mere luck, to be considered as knowledge. This would lead us to the second characteristic of knowledge.

► **Justified:** When Alice and Bob say that it's raining outside, where Alice just guessed, and Bob have looked through the window and actually saw the raining. One must consider the two ways, upon which they stated the condition of weather, differently. The first is unable to answer, "*Why do you believe that it's raining?*", while the latter would.

Assume that Alice and Bob always hold beliefs, by the way proposed, Alice only guesses, and Bob tries to justify what he considers true and if there's no justification, he would simply change his mind. Now if you are to use the information from one of them, who would you choose? A logical answer would be to always ask Bob, since there's atleast an argument upon which he considers the belief to be true.

Knowledge should be justifiable, this is more than just having good excuses to believe something, because it also helps the process of finding truth working, believing without justification cannot be questioned properly (other than questioning the unquestionability itself.). Being justifiable helps us to use the socratic method, either we derive an unquestionable fact underneath, or we find another belief which can or cannot be justified. Therefore it seems that *Knowledge is Justified True Belief*.

But there are problems with such statement, since the justification condition was added to ensure that the belief is not true merely because of luck. For instance believing you

have lung cancer, because an astrology magazine suggests, would be considered not justified from a scientist perspective but justified if you believe in astrology.

Edmun Gettier, showed that there are cases of *Justified True Belief* that are not cases of knowledge. JTB, therefore, is not sufficient for knowledge. Cases that this is the case are known as the Gettier cases, which arise because neither the possession of adequate evidence, nor origination in reliable faculties, nor the conjunction of these conditions, is sufficient for ensuring that a belief is not true merely because of luck. This suggests that we must add another element to JTB, so that it is sufficient to be considered Knowledge.[10]

► **Defining Justification:** Imagine a situation where a kid, despite having a birth certificate, and what he has been told his entire life, were to find that the parents he thought are not his actual parents. This situation shows that although a belief was justified, it ultimately came to be wrong. Debates concerning the nature of justification can be understood as debates concernin the nature of such non-knowledge-guaranteeing cognitive successes as the one this imaginary kid would enjoy.

The term justification is used as to say *under no obligation to refrain*. This definition of understanding is labeled as *Dentological Justification* we can define:

"S is justified in doing  $x$  if and only if S is not obliged to refrain from doing  $x$ ."

So for the term justification we would define:

"S is justified in believing that  $p$  if and only if S is not obliged to refrain from believing that that  $p$ ."

The dentological understanding of the concept of justification is common among philosophers such as, Descartes, Locke, Moore and Chisholm.

Dentological justification is commonly used, "*Inocent until proven guilty*" is an obvious example in law, where we are assumming the most common assertion (people are mostly inocent) until there's an evidence to support otherwise. But such generalization is not the case in science, or to be more specific, until no evidence is gathered, we cannot put our finger on where the logical place to stand is. Although it is important to get back to dentological justification in science. We'll cover the use of it later.

But on the other hand we can define another type for justification:

"S is justified in believing that  $p$  if and only if S believes that  $p$  in a way that makes it sufficiently likely that her belief is true."

Dentological justification, though promising, lacks an important concept, where the justification should be correlated with the evaluation of the belief, one can believe in a justified manner (dentologically), but nevertheless his/her belief is false. The problem arises since dentological justification asserts true until proven false (we are justified to believe that  $p$  is true because there's no obligation to refrain us from doing so), This sort of implication puts facts, and unfalsifiable assertions into one basket. We are able to be justified in believing any sort of assertion even if it is not justified.[10]

As an easy example of how a dentological justification might result in a false belief let us review the Russell's teapot analogy, though the claim is to show that the philosophic burden of proof lies upon a person making empirically unfalsifiable, the example would also show how a dentological justification is weak. [13]

In his paper "Is There a God?" we have:

"Many orthodox people speak as though it were the business of sceptics to disprove received dogmas rather than of dogmatists to prove them. This is, of course, a mistake. If I were to suggest that between the Earth and Mars there is a china teapot revolving about the sun in an elliptical orbit, nobody would be able to disprove my assertion provided I were careful to add that the teapot is too small to be revealed even by our most powerful telescopes. But if I were to go on to say that, since my assertion cannot be disproved, it is intolerable presumption on the part of human reason to doubt it, I should rightly be thought to be talking nonsense. If, however, the existence of such a teapot were affirmed in ancient books, taught as the sacred truth every Sunday, and instilled into the minds of children at school, hesitation to believe in its existence would become a mark of eccentricity and entitle the doubter to the attentions of the psychiatrist in an 10 enlightened age or of the Inquisitor in an earlier time."

Although the debate, that is there any evidence to prove gods existence remains, for what seems like forever, the burden of proof is always upon the one claiming it. There are several more cases that can easily fit under the label *Knowledge*, that no-one would accept, most of the folklore sotries of beings such as Zeus, Thor, unicorns, etc... were widely regarded as a true belief, with the justification that you cannot disprove their existence. But any person in the 21st century would deny their existence. Therefore, the second type (Sufficiently Likely Justification), seems to work the best for most cases, and be the justification that Russell would mean.[9]

► **Kant, Schelling, Fichte and Evidence:** As we mentioned the idea of Parmenides was that the true knowledge must be based only upon rational thought, which lead to reconstruction of reality with deductive method. This has been applied by mathematician Euclid for the axiomatic foundations of his geometry, which was leading to the modern-rationalism. The idea was that the true knowledge should be deducible in its entirety from a highest, and in itself irrefutable, but also to be capable of providing a justification for the claim that the knowledge deduced from it should be coherent and true. principle, which is still carried on by physicists who are dealing with the ultimate formulation that would describe the nature in its entirety.

This is a very basic but logical step toward knowledge, since the world around seems to have order, and order seems to originate in logic (you may be able to make an orderly system with chaos at its foundations but we are trying to follow a more common step.).[6]

Kant's philosophy focuses on power and limitations of reason. Kant asks two questions whether reasoning can give us metaphysical knowledge, as rationalists claim? and whether reason can guide action and justify moral principles. He claims against the rationalists that if boundaries like knowledge of god or a world beyond senses is not considered, reasoning would provide contradiction. And for the empiricists, who claimed that emotions, and not reason would guide us toward action, he claims that reason can guide us toward principles that can be shared among rational beings.

Kant argues that we obtain knowledge by two ways: sensibility and understanding. Empirical judgement depend on both. Later in the book he discusses the *Transcendental Dialectic*. He argues against the effort by philosophers such as Parmenides that try to subject the true knowledge free of worldly objects. He adds that the *Dialectic* for the things, which are not revealed by any senses is *logic of illusion* (This turns out to be an important part in later chapters where we enter mathematical logic, and show that there can be multiple logical systems, however inconvenient.)[15]

"The law of reason to seek unity is necessary, since without it we would have no reason, and without that, no coherent use of the understanding, and, lacking that, no sufficient mark of empirical truth"

The analysis of the conditions under which knowledge becomes possible led him to the concept of *Transcendental Subject* as the source of knowledge. prior to all experience. He argues that the subject's perception of the external world is affected by, as he called it, *Things in Themselves*. Following Kant, this constitute reality intrinsically, that is, independently of how we may experience it. This can be thought of as objectivism, putted more easily by Democritus, the idea that has been employed in Democritus' discussion

of the gods, where he clears that our knowledge of the gods comes from giant films of atoms (since he constructed his worldview with atomistic view). A report credits that Democritus and Leucippus argue that thought as well as sensation are caused by images impinging on the body from outside, and that thought as much as perception depends on images.[2][1][4]

This conception was rejected first by Fichte, in 1794, in his *"Doctrine of Science"*. He argues that the knowledge engendering function of "things in themselves" leaves knowledge still dependent upon the external world, and that knowledge therefore lacks the property of being unconditional. However, in Fichte's view unconditionality is an indispensable prerequisite if knowledge acquired by the transcendental subject is to be absolute and no longer dependent upon changes in external experience. Fichte therefore set out from the idea that the actions of the transcendental subject must be completely unconditional, that it, caused only by itself.

The radical subjectivism that we encounter here was already in Fichte's time a target of criticism. Fichte's philosophical approach, promoting the perceiving subject to the sole and unconditioned source of knowledge, led inevitably to a contradiction with empirical reality. In respect of its understanding of reality, the subjective idealism of Fichte clearly reveals the same weakness, the same loss of reality as did Parmenides' doctrine of true being.

In his *"Ideas for a Philosophy of Nature"*, published in 1797, Schelling attempted to correct this deficiency by first objectifying the subject-object identity and not as, Fichte had done, regarding it as an identity proceeding exclusively from the subject. Moreover, according to Schelling the subject-object identity must be considered as absolute. This means that the entire Subjective is at the same time the entire Objective, and the entire Objective is at the same time entire Subjective.

Unlike Fichte, in Schelling's philosophy real world is more than just an image of the ideal world. He considered the conceptual and material appearances as two manifestations of the same entity, which was an absolute subject-object identity.

"Nature is the visible mind, the mind is invisible Nature". This is to be taken as meaning that the perceiving subject can regard itself in Nature as in a mirror. Nature is the visible mind. Conversely, mind is invisible Nature, insofar as mind mirrors Nature at the highest level of its being. Thus, mind in Nature and Nature in mind can contemplate one another."

In Schelling's system, the task of empirical science is —at best— to verify the principles dictated to it by natural philosophy. On no account could they be disproved: the refutation

of these principles would immediately have refuted the principles of reason and, thus, pursued the possibilities of cognition ad absurdum. *In fact, the principles of natural philosophy were seen as unchallengeably certain. If empirical results did not accord with them, then the principles remained unchallenged, whereas the empirical observations were taken to be obviously at fault, or incomplete, or deceptive.* This is yet again closer to the concepts introduced by Parmendise and Fichte than to what is science trying to acheive. Although it is true that logical statements remain unchallenged, this is not because they have a higher values regarding empiricism. The logical statements remain unchallenged because they statements are build upon logical systems, which are agreed upon. In that sense any logical system would be working as good as science, and if so the nature would act in thousands of ways at the same time just to make the logic be true. But if we assume that the logic of the world remains a unique one, then working with logics and using empirical information just to prove our points seems to be missing an important fact, that we are to choose between many ways of possible logical system and yet expect that to be the right one, which describes the universe, by pure chance.

A further aspect of Schelling's epistemology should be emphasized. In accordance with the identity principle, the ideal and the real together make up a whole that cannot be transcended. The whole is at the same time an allegory for the absolute, which however only reveals itself in the dichotomous form –that is, in ideal and real essence– to the subject. However, the absolute, whe it “expands” into the ideal and the real, must not lead out of the absolute. As the absolute, it must always remain identical with itself in its entire absoluteness.

"Natural philosophy and empirical research into Nature are thus concerned with two fundamentally different objects of knowledge. One is concerned with “Nature as a subject” and the other with “Nature as an object”. “Nature as a subject” is a metaphor for the infinite productivity of Nature (“natura naturans”). It is downright natural dynamics. Its driving forces are the creatively acting natural principles, the discovery of which is the task of natural philosophy. “Nature as an object”, in contrast, is the productivity of Nature as made manifest in her products (“natura naturata”). These products are in themselves finite and appear as a terminated network of actions, the elucidation of which is the task of empirical research into Nature. However, to avoid the conceptional separation of Nature into two forms, Schelling employed an artifice."

According to this, the productivity of Nature is not really extinguished in its products; rather, it still remains active with a force of production that, however, is infinitely delayed. As

already encountered in the philosophy of the Eleates, the concept of the infinite again must be invoked in order to save the consistency of the epistemological model.[6]

In summary, we can say that Schelling's philosophy of Nature ran counter to today's scientific method in two important respects:

- Theory occupies a more important place than empiricism. Claims to truth need not stand the test of experience; they are exclusively derived from logical reasoning. In short: Knowledge a priori is given precedence over knowledge a posteriori.
- The research strategy propagated by Descartes, Newton and others, according to which one should proceed from the simple to the complex, from the part to the whole, from the cause to the effect, is turned by Schelling into its opposite. The analytical method, based upon dismantling, abstraction and simplification, is discarded—or at least diminished in importance—in favour of a holistic method.

The addendum to the Introduction of Schelling's "Ideas of a Philosophy of Nature", in which he repeatedly attempts to express the inexpressible, is rich in morsels of poetic word-creation and pictorial comparison that exhaust themselves in nebulous abstraction. We read, for example, that the absolute is “enclosed and wrapped up into itself”, or that the absolute “is born out of the night of its being into the day”. There Schelling speaks of the “æther of absolute ideality” and the “mystery of Nature”.

Even the closest philosophers of the Jena Romantics' Circle, such as Friedrich Schlegen and Johann Wilhelm Ritter, criticised the notion that pure speculation, unaided by any experience, could provide the basis for any profound knowledge about the world. We shall according to Ritter, : approach imperceptibly the true theory, without searching for it– we shall find it by observing what really happens, for what more do we desire of the atheory than that it tells us what is really happening?"[6]

### 3 Evidentialism

Whether a blief is truley justified or not, there's something that makes it so. But before we begin with the concept of evidence it is useful to check some ideas from Parmendise, Schelling and others.[10]

The strongest case for a justification to be accurate seems to be the case of evidence.

"According to Evidentialism, one is justified to believe something if and only if that person has evidence which supports said belief. [12]"

It is commonsense that one possessing a belief must have a reason to, whatever that may be. This dependence on reasons seems to be central to the very concept of justified only



if one has adequate reasons to believe. Richard Feldman and Earl Conne, were two leading defenders of evidentialism using their definition:

"Evidentialism is a thesis about the justificatory status of all the doxastic attitudes: belief, disbelief, and suspension of judgement."

Therefore defining justification all again as:

"The Doxastic attitude,  $d$ , toward  $p$  is justified for one at  $t$  if and only if one's evidence at  $t$  supports one's tating  $d$  towards  $p$ ."

► **Evidence:** Evidence for or against  $p$  is any information that can evaluate the validity of  $p$ . That is to say any statement that can prove  $p$  of being true or false.[8]

With such broad definition we can consider Schelling, Fichte, and Parmendise as evidence. But as we memtioned the nature of such justifications are far form being scientific. Here we examine ways that one would consider as ways to acheive evidence

► **Rationalism and Reliabilism:** We already investigated how Schelling would consider rational thought and logical process to be evidential. Though he considered empiricism to be important he didn't consider it as equal to ratoinal thought, therefore we can consider him as a rationalis. Rationalists believe that logic is the source of knowledge, Syllogisms, which is a logical argument that applies deductive reasoning to arrive at a conclusion, can be used –and if used properly– to acheive knowledge. [14]

If  $A$ , then  $B$ ;  
 $A$ ;  
 $\therefore B$

The problem with such method is, that there's no limits on what permises you use. One can form such arguments using this logic:

If Alice is awake, it is morning.  
 Alice is awake.  
 $\therefore$  It's morning.

Although many people would consider these statements as true and thus regard the whole argument as true, one can easily see that the premise would not necessarily follow the conclusion (Alice could grow insomnia and not sleep at all). Beside the usage of different logic systems that can raise contradiction with the reality, using premises that doesn't imply the conclusion are another problems many logical arguments can have. This can be at best put in a toolbox of evidences, not the evidence as a whole.

Reason alone, shall not be taken for granted. The premises

should follow the conclusion, and the logic must be the actual logic that is working in reality (or nature). The conclusion of this point is that rational thought is not enough to be considered evidence. [11]

Extending beyond human reasoning which shown to be mistakeful, what if we use a mathematical approach. The investigation over if mathematics can be a solid ground work would be passed to next sections, but for now, as we mentioned for the logical errors one might get consider the following argument:

$$\begin{aligned} x &= c \\ x^2 &= cx \\ x^2 - c^2 &= cx - c^2 \\ (x + c)(x - c) &= c(x - c) \\ x + c &= c \\ 2c &= c \\ 2 &= 1 \end{aligned}$$

Here we found an argument that works by mathematical laws but yet results in errors. To be more accurate this problem is not because of matheamtics, since in itself won't allow  $(x - c)$  to be canceled out from the sides of the equation when it's zero. Here we made the mistake by not using the logical system properly. [11]

► **Coherentism:** We might look for an all-time true statement, which cannot be false anyway, and then try to work through other statments to see if they can be implied by that statement, or any other statemtns, which validity are proved by the original one. By this method we are looking for coherent statements beside the original-true-statement.

Coherentism lends itself to yet another way of knowing that can be similarly flawed, the *Perfect credibility*, In the paper [11], Wenning argues:

"To the medieval mind it was only reasonable that the Earth was at the center of the universe, the lowest point possible under the heavens. To medieval thinkers humanity was at the center of the universe not because of our noble status as the pinnacle of creation, but because we were so very despicable with our fallen nature. Closer to the center of the universe still was that place at the very center of the Earth that was reserved for the most despicable of all – hell. Those not so terribly bad were relegated to the underworld or Hades upon death, but not hell."

This is the reason why the medieval viewpoint envisioned heaven as "up" and hell as "down." Man's position near or at the center of the universe was not pride of place; rather, it was a matter of making perfect sense in man's relationship

with the deities. This belief was perfectly credible. Interpreting things in any other way would have made no sense given the then prevailing theological understanding. But still these conclusions were false, this problem arises because in choosing a coherent statement with the all-true-statement we are neglecting that in principle such statement may be false, thus the system would collapse as soon as one of the all-true-statements proved to be wrong. Using such method can be helpful to gather coherent statements together, but also can be dangerous if it is to lead us alone. We would like to find a law that implies good results and then finding coherent laws that would imply more things but we have to make sure that we are always in search to disprove such law. But how?

## 4 Empiricism

Empiricists also endorse the Intuition/Deductio thesis as would rationalists do but for a significant difference, the use of rational thought, mathematics and logic is not to prove all alone but to guide us through what to check for. By contrast, empiricists reject the Innate Knowledge and Innate Concept theses. Insofar as we have knowledge in a subject, our knowledge is gained, not only triggered, by our experiences, be they sensorial or reflective. Experience is, thus, our only source of ideas. Moreover, they reject the corresponding version of the Superiority of Reason thesis. Since reason alone does not give us any knowledge, it certainly does not give us superior knowledge. Empiricists need not reject the Indispensability of Reason thesis, but most of them do.[7]

"*The Empiricism Thesis*: We have no source of knowledge in S or for the concepts we use in S other than experience."

Callout — To be clear, the Empiricism thesis does not entail that we have empirical knowledge. It entails that knowledge can only be gained, if at all, by experience.

The Empiricism is not better just because of empirical data, but also since it uses the best other ways have to offer. The data is to prevent us from being mistakeful.

We are blinded by many things, our logical errors, our low intuitions in the world, our ability to cause mistakes in logical systems and so on, so one would argue that it is logical to find a source, not in ourselves but in anything else, that acts in logics, but also cannot be threatened by our flaws. The reason natural philosophy has taken the turn into empiricism might be the from that reason, since the task itself is to describe nature, why not ask her for knowledge.

Here one might ask for the role rational thought, mathematics and logic. The use of them are not to invent the nature, as we saw earlier they can put us in a lot of trouble. But the problems with purely observing at nature is two,

firstly it is pretty hard to derive a conclusion since the systems in nature are complex, thus one cannot observe and then derive the rule behind it, although we try to isolate simple system in the lab to be able to perceive the most from them. Second there are many ways to describe a natural process in terms of words and intuition, Aristotle said that objects fall because each of the four elements (earth, air, fire, and water) had their natural place, and these elements had a tendency to move back toward their natural place. Thus, objects that were made of earth wanted to return to Earth, whereas fire, for example, rose toward heaven.[5]. This would make us consider a more rigid form of reasoning, that is mathematics, which uses more than words, but describes relations:

$$F = \frac{d}{dt}p \quad (1)$$

The Newton law describes the relation between a net force, and the object's momentum, which are also defined using mathematics. With this equation we don't need to say what an object is moving toward is, we just need to ask if there's a force acting upon it. Therefore it is necessary to use a rigid format of logic to describe what seems to be a logical nature.

## 5 Conclusion

In this draft I gathered information regarding epistemology and tried to look at the problem of gathering knowledge for human. Investigated from different approaches and regarded their flaws, the argument was trying to show in a simple manner, why the scientific method, which would be described in later drafts work the way it does and actually gives rise to true statements.

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