

The Epistemological Status of Sensible Objects in Descartes' Philosophy

Dr. Menana Battache¹

¹Department of Philosophy, Teacher Training School of Bouzareah (Algeria).

The Author E-mail: battache.menana@ensb.dz

Received: 01/09/2023

Published: 02/02/2024

Abstract:

This article attempts to understand the epistemological status of sensible objects in Descartes' philosophy, which considers knowledge of bodies through sensory perception as non-certainty, and claims that the external world cannot exist as we perceive it through our senses because they deceive us, and what comes to us through them can only lead us to error and therefore must be rejected.

This means that what is sensible in Descartes' philosophy cannot be sensibly known, and it represents one of the most important problems of modern philosophy in general, and of Descartes' philosophy in particular. In order to overcome this situation, Descartes resorted to knowing the sensible through deductive rational knowledge based on mathematical intuitions, by relying on some cognitive tools such as doubting the senses and rejecting their testimonies, and relying on geometric extension instead of sensory extension, and then connecting the natural world with mathematical thought.

In order to do this, Descartes first had to establish a new method containing rules that, if followed by reason, would lead it to the knowledge of the truth that it did not know, and to recognise the error he was committing in knowing the sensible by relying solely on the senses.

Keywords: Sense, sense perception, rational perception, sense extension, geometric extension, natural world, mathematical thinking, method, inference, intuition.

Tob Regul Sci.™ 2024;10(1): 1406 - 1419

DOI: doi.org/10.18001/TRS.10.1.91

Introduction:

Cartesian philosophy is not an isolated and unique event, but a complex and multifaceted phenomenon. It is the profound transformation of philosophy initiated by Descartes (1556-1650) at the beginning of the seventeenth century. On the one hand, it represents a decisive moment in the history of human thought in its various scientific, philosophical and theological forms. On the other hand, it indicates the rupture that Descartes introduced between his philosophy and all previous philosophies, whether ancient or medieval. According to Descartes, this rupture is a fundamental condition for the construction of a new, comprehensive cognitive framework, beginning with the liberation of the mind from any form or content of error. In his view, this means freeing the mind from all the constraints that bind it and from the senses that deceive it.

By these constraints, Descartes means the whole of Aristotelian and Scholastic thought, including its various aspects: logical, philosophical, scientific and theological. Descartes intends to embark on a new quest to discover other new principles that can serve as a rational basis for new knowledge that satisfies the mind. This is achieved by:

First, establishing new foundations for science that ensure the reliability of clear and distinct ideas and their relation to objective truths.

Second, by devising a new method for discovering knowledge, not by traditional deduction, but by intuition, the direct intellectual insight that grasps simple natures.

The results of Descartes' philosophy revolve around the question of knowledge and truth. For Descartes, radical doubt and philosophical scepticism are essential tools in the quest for truth.

This view led Descartes to consider that everything that comes to us through the senses or sensory perception can only lead us to error, and therefore it should be rejected. According to Descartes, everything we know sensory about the external world must be assumed to be devoid of any truth. However, what caught my attention is this: if the correct ideas for Descartes are clear, distinct, and resistant to doubt, and their origins can only be found in our minds, referring to innate ideas such as mathematical ideas, the principles of logic, the idea of God, etc., what is the fate of ideas related to the sensory that we only know through doubtful sensory perception? Or how was Descartes able to establish a certain physical science whose subject matter is sensory phenomena, knowledge of which is uncertain? Or, in other words, what is the relationship between the natural world and mathematical thought according to Descartes? And how did he establish harmony between our thought and the external world?

1- Critique of the Sensory: Descartes did not give any importance to the common sense perception shared among people. He emphasized that the nature of the body does not lie in weight, hardness, smell, or similar things, but only in extension. Descartes divided the qualities of the body into two categories: primary qualities such as shape, extension, and motion, which can only be known by the mind, and secondary qualities such as smell, color, size, etc., which can only be known through the senses. Descartes did not see any scientific or epistemic value in this latter knowledge. Its value lies only in the practical aspect when humans benefit from it in their daily lives, as it is what connects them to the external world.

This view led Descartes to consider that everything that comes to us through the senses or sensory perception can only lead us to error, and therefore it should be rejected. According to Descartes, everything we know sensory about the external world must be assumed to be devoid of any truth. However, what caught my attention is this: if the correct ideas for Descartes are clear, distinct, and resistant to doubt, and their origins can only be found in our minds, referring to innate ideas such as mathematical ideas, the principles of logic, the idea of God, etc., what is the fate of ideas related to the sensory that we only know through doubtful sensory perception? Or how was Descartes able to establish a certain physical science whose subject matter is sensory phenomena, knowledge of which is uncertain? Or, in other words, what is the relationship between the natural world and mathematical thought according to Descartes? And how did he establish harmony between our thought and the external world?

Critique of the Sensory: Descartes did not give any importance to the common sense perception shared among people. He emphasized that the nature of the body does not lie in weight, hardness, smell, or similar things, but only in extension. Descartes divided the qualities of the body into two categories: primary qualities such as shape, extension, and motion, which can only be known by the mind, and secondary qualities such as smell, color, size, etc., which can only be known through the senses. Descartes did not see any scientific or epistemic value in this latter knowledge. Its value lies only in the practical aspect when humans benefit from it in their daily lives, as it is what connects them to the external world.

This led to a kind of contradiction in Descartes' philosophy regarding the nature of matter, with its various sensory qualities we mentioned earlier, and the way we know it. If matter is perceptible, then its knowledge must necessarily be through the senses alone. However, Descartes insisted on avoiding any connection with sensory perception as a tool of knowledge and rejected the testimony of the senses as being prone to illusion and error. He emphasised that it is not wise to trust what has deceived us once, and the senses have often deceived us and continue to do so. Therefore, sensory perceptions cannot be taken as knowledge that corresponds exactly to reality, and everything we can know about the external world through the senses must be considered to be devoid of any truth. Descartes said: "Everything I have hitherto accepted as most true and certain I have learned either from the senses or through the senses. Occasionally, however, I have found that these senses have deceived me, and it is wise not to trust completely those who have deceived us once¹".

From the above it is clear that the knowledge of the sense bodies through the senses is not clear and distinct, and the external world cannot exist as we know it through our senses. The ideas we receive through the senses are vague and can never give us a clear and distinct idea of the external world, such as the nature of matter, light, sound, or the dimensions of the moon and sun. A single thing can give rise to several images under different conditions, and it is impossible for us to know which of these images is true and corresponds to reality, and which are false. Descartes says: "If the sense of hearing communicated to us the true nature of its object, we should have to imagine that it made us perceive the movements of the air vibrating in a certain way against our ears²".

Therefore, Descartes argued that one should not rely on the senses to gain certain knowledge, because the ideas conveyed by the senses do not necessarily correspond to the objects in the external world. Sensory perceptions are always different because they are constantly changing in terms of shape, colour and texture. Let's take, for example, as Descartes did, a piece of beeswax, which has different properties such as colour, size and smell. We can recognise it, but if we put it near a fire, its colour will change, its smell will disappear, its size will change and it will become liquid.

The question that Descartes asked, and that we ask in this context, is this: Does wax still exist after all these transformations? The answer is that no one can deny the existence of wax, but what is left of it after all its properties that fall under our senses, such as smell, sight and touch, have changed?

¹- René Descartes: "Meditations on the First Philosophy". Translated by Othman Amin. Cairo: Anglo-Egyptian Library, 1969. Meditation 1, page 3.

²- René Descartes: "The World or Discourse on Light". Translated by Emile Khoury. Beirut: Dar Al-Mankhoub Al-Arabi, 1999. Page 49.

Before answering this question, we can conclude from our analysis of this example that the wax is not this particular colour, smell or size, and it has never ceased to exist because the mind continues to perceive it. But what does the mind perceive in it?

What remains of the wax that the mind perceives clearly and distinctly is its extension. However, it is not the sensory extension that we perceive through our senses, but rather the intellectual extension that is abstracted from colour, sound and touch and resembles geometric space. Descartes says in this sense: "But what is particularly to be remarked here is that its perception - the perception of the wax - is neither an act of sight, nor of touch, nor of imagination, and never has been such, although it may have seemed so to me in the past; but it is an inspection by the mind alone, which may be imperfect and confused, as it was before, or clear and distinct, as it is now, according to the degree to which my attention is directed to the elements which it contains and which it comprises³".

2- Extension: After Descartes confirmed his knowledge of his own existence as a thinking and distinct entity separate from his body, the cogito, and his knowledge of the existence of God as the ultimate source of all things, who cannot deceive or be deceived, he proceeded to prove the existence of material things that God guarantees. If the attribute of the mind is thought, then the attribute of an object or body is extension, which represents the nature of matter, body, and space simultaneously. Descartes addressed this in the beginning of the second part of his book "Principles of Philosophy," where he discussed the correspondence of extension, place, and matter by virtue of their shared ontological status according to the issue of the creation of eternal truths. For there is no existence of place except in relation to the matter that fills the entire world, stating: "First, I observe that I can clearly and distinctly imagine that quantity that philosophers commonly call continuous quantity or extension in length, breadth, and depth, which is the extension that is present in that quantity, or, to put it more precisely, in the things we describe through it"⁴.

Descartes does not mean sensory extension with its various qualities such as smell, color, size, etc., which we know through our senses. Rather, he means the intellectual and abstract extension devoid of colors, shapes, etc., as sensory qualities are insufficient to provide clarity, distinctness, and a true conception of the body. This is evidenced by his analysis of a piece of beeswax in his work "Meditations on First Philosophy," particularly in the fifth meditation: "In the nature of the human mind, and that its knowledge is easier than the knowledge of the body." He also addresses this idea in previous paragraphs.

This suggests that we do not know the external world through sensory perception, which is of dubious reliability. Rather, we know it through intellectual perception. Descartes says: "The nature of a body in general is not that it is solid, heavy, or coloured, or that it affects any of our senses. Rather, it consists solely in its being an extended substance in length, breadth, and depth"⁵.

1- In fact, this extension represents the essence of the body, which is different from the essence of the mind. This means that the external world, with all its sensory phenomena, can only be known

³- René Descartes: "Meditations on the First Philosophy". Second meditation, paragraph 13.

⁴- René Descartes: Same source as above, Dedication to the Deans of the Faculty of Sacred Doctrine, page 39.

⁵- René Descartes: "Discourse on Philosophy". Part 2 in "Works and Letters", published by Gallimard, Paris, 1953. Paragraph 4.

through the abstract extension that we perceive with our mind, not with our senses. In Descartes' philosophy, the perceptible does not play a significant epistemological role because its validity is doubtful.

Descartes' aim in this respect was to reject Aristotelian physics, which regarded the body as a composite entity of form and matter, arguing that the explanation of any body in Aristotle's view could only be done by attributing to it a form that represented its essence. Descartes, on the other hand, believes that there is nothing outside of thought except extension and motion, and he rejects substantial forms, which he sees as an obstacle to scientific progress, and adopts mechanistic explanations.

2- Matter, which in Greek philosophy was considered a secondary element that the mind could not comprehend, was transformed into an object of scientific study, subject to geometric demonstration, because it was understood as a geometric space with length, width and depth. Descartes states:

"First, I find that I can clearly and distinctly imagine that quantity which philosophers commonly call a continuous quantity or extension in length, breadth and depth, which is the extension that is present in that quantity⁶".

Thus, according to Descartes, abstract geometric extension became the main attribute that allowed us to know the external world or the body. Along with this, the concept of motion, i.e. the succession of places occupied by a moving body, became an essential subject of natural science or physics, to be studied in a purely mathematical and mechanical way. This necessitated a necessary relationship between the natural world - the world of things or bodies - and mathematical thought, and a necessary relationship between the idea and the thing, or between our thought and the external world⁷.

3- The relation between the natural world and mathematical thought: Descartes believes that the nature of the body is extension, which is itself the subject of geometry. Therefore, the interpretation and understanding of the body can only be achieved through the study of extension, which involves the study of spaces, lines and sizes, which are themselves the subject of geometry. He says: "I confess that I know of no other substance for material things than that which can be divided, shaped and moved in different ways, namely the substance which the geometers call quantity or extension and which they take as the subject of their reasoning"⁸.

Therefore, according to Descartes, material things consist of extension, which is studied in geometry. If metaphysics reduces matter to geometric extension, physics, according to Descartes, reduces it back to geometry. This justifies considering Descartes' physics as mathematical physics, based on proof and the use of calculation. According to Descartes, the whole world is reduced to measurement and number, and in his view, God has ordered everything in terms of quantity, weight and measurement. Mathematics thus becomes not only the language of physics and a means of expressing its problems, but also a model of certainty, precision and proof. It becomes easy to

⁶- René Descartes: Same source as the first reference, Fifth Meditation, paragraph 2.

⁷- Mohamed Hisham: "Philosophical Theory of Knowledge". Casablanca: East Africa, 2001. Page 72.

⁸- René Descartes: "Cartesian Philosophy". Same source as reference 5, paragraph 64.

understand and use because Descartes believes and asserts that all the difficulties philosophers face in their physics stem from their unclear understanding of matter, which is difficult and complex.

By relying on mathematics as a language of expression and as a model for intellectual knowledge, Cartesian physics only accepts ideas that are clear, unambiguous, abstract and based on mathematical principles. Descartes says: "I accept no principles in physics unless they are acceptable in mathematics, for it is necessary to be able to prove everything we deduce. These principles are sufficient to explain all the phenomena of nature". For Descartes, for example, a triangle does not necessarily have to exist; it is an assumption. The assumption of the existence of a triangle requires only that its three angles are equal to two right angles. He just wants physics to be geometrically proven physics, following the mathematical method. His basic idea is that mathematics alone provides proof because it is based on unquestionable foundations⁹.

When Descartes studied the falling of bodies and their relation to weight and lifting weights, etc., he relied on these conditions and reduced all of physics and its problems to mathematics.

This made his physics purely mathematical, judging by it the barrier between the natural world and mathematical thought, or between the idea and the thing. This is contrary to what was prevalent in Aristotelian and Scholastic philosophy, which separated mathematics from physics because the former is abstract and the latter sensory¹⁰.

The dependence of physics on mathematics is not a new idea introduced by Descartes, but was preceded by Galileo Galilei (1564-1642). Galileo saw the whole world as a book written in the language of mathematics, whose letters were triangles, circles and other geometric shapes. According to Galileo, it would be impossible for man to understand a word of this book without understanding these mathematical symbols¹¹. Galileo's scientific works, which represented the new mathematical development of space, played a crucial role in shaping Descartes' later ideas. This led Descartes to recognise the need to incorporate geometry into physics, a notion further developed by Isaac Newton (1643-1727). It was through their discoveries and innovations that they derived this geometry.

In doing so, Descartes did two important things: he emphasised the use of reason over sensory experience, and he relied on quantity rather than quality. This embodies the spirit of mathematical physics, which involves incorporating the certainty of mathematical proof into natural philosophy or physics and reducing matter to geometric space.

Descartes prioritised the supremacy of the mind over experimentation, emphasising the need to direct the intellect correctly in order to arrive at truth. He elaborated on this idea in his works *Discourse on Method* and *Rules for the Direction of the Mind*. Through these writings, Descartes aimed to purify thought from various superstitions and illusions, and to free the mind from various

⁹- Ibid. (Ibidem) p. 64. (Same source as the previous quotation).

¹⁰- Roger Texier: "Descartes the Physicist", published by l'Harmattan, 2008. Page 13.

¹¹- Galileo Galilei: "L'essayeur", quoted by Alexandre Koyré. Translated by Youssef Ben Othman. Tunis: Sinatra, 2008. Page 351.

constraints and obstacles. He saw the intellect as the most beautiful of all things that divided humanity.

The geometry invented by Descartes and later adopted by physics served as a cognitive tool that could lead to scientific discoveries capable of changing the course of the world and accelerating scientific progress.

However, due to philosophical considerations (which need not be discussed in this article) and his attempt to establish a purely mental physics based on the principles of mathematics, as expressed by Heinrich Huggens (1629-1695), Descartes concluded that there was nothing in his physics that did not exist in geometry. This ultimately led to the construction of an imaginary physics that resembled a philosophical narrative, creating a world that could only exist in his imagination, as Voltaire (1694-1778) put it. This led him to consider matter and space as a single entity in order to bring physics back to geometry.

Alexander Koyré (1892-1964) considered Descartes' excessive reliance on geometry to be a mistake that led him to be wrong about the laws of motion, except for the first law, as well as the nature of light, and so on. As a result, Descartes found himself in a dead end, and his physics lacked the continuity that Newtonian physics possessed because of his exaggerated reaction to geometry, even though it is inherent in its nature. Although Einstein himself attempted to reintegrate matter into space, the question arises: How did Descartes manage to justify what he arrived at, i.e. the existence of harmony between mathematical thought and the sensory world? And how did he establish a purely mental and mathematical physics that is in harmony with the sensory phenomena that exist in reality? And what, in his view, guarantees the truth of this harmony?

Descartes believed that mental ideas do not necessarily correspond to external entities, and yet all the mental judgments we make about these external entities must correspond to these ideas in order for these judgments to be true¹².

This is because God imprinted these ideas in our minds to express everything that exists in a sensory way. He says: "I have first tried to find the general principles or ultimate reasons for everything that exists or can exist in the world, without assuming anything in this regard except God alone as the Creator of this existence, and without deriving these principles or reasons except from some roots of truth that are naturally present in our minds". In other words, God created existence and established laws within it, then imprinted the images of these laws in our minds and created harmony between them through their common obedience to Him. Descartes believed that the various mathematical and logical truths that God placed in our minds, which are the most beautiful expressions of pure thought, are also present in nature. Thus, Descartes had two worlds: the world of thought and the world of sensory phenomena, because without the existence of various mathematical and logical truths - which are the most beautiful expressions of pure thought - in the mind, and without the existence of mathematical reality in nature, man, unlike other creatures, would not be able to discover the secrets of this universe and know the laws by which it operates, in order to become master of it.

¹²- René Descartes: "Meditations on Method". Sixth part. Translated by Jamil Saliba. Algeria: Mawfam Publishing, 1991. Pages 84-85.

We can conclude from this that it is God who has created the correspondence and harmony between these two worlds, and within the truth and validity of this harmony, because there is no guarantee of truth and certainty in our souls and in all science except God alone. Descartes says: "I have also found some laws which God has established in nature and impressed their images on our minds. If we think about them carefully and attentively, we have no doubt that everything that exists and happens in the world is governed by these laws. Moreover, when I examined the chain of these laws, I discovered many truths more useful and important than anything I had previously learned"¹³. This idea is intertwined with the issue of the creation of eternal truths that form innate ideas that allow the human mind to conceptualise and perceive the essence of material things without relying on imagination or the senses.

This innateness is quite different from the realism of Aristotle or the idealism of Plato, which regard mathematical and logical ideas as pre-existing divine perceptions that play the role of archetypes. Descartes, however, considered them to be created in the same way as other creatures, and this made them descend from the rational world of ideas, since they are not part of the rational reality of God, into the created world. This position is completely different from what was prevalent in medieval philosophy and what St Thomas Aquinas (1225-1294) believed.

The existence of these eternal truths, including mathematical truths, in the minds of human beings serves two purposes for Descartes:

1. To regard our intellectual faculties as a tool for knowledge, not a tool for illusion and superstition.
2. To free physics from theology and make it independent of it.

In addition to the above, for Descartes, nature became a mere geometrical extension, speaking the language of mathematics, studied in a scientific manner, with the primacy of reason rather than the senses. This is in contrast to the Greeks, who saw nature as a closed universe, ontologically conceived and considered sacred, free from corruption.

This is not to say that Descartes rejected experimentation altogether. He sometimes relied on it because it demonstrated the harmony between our concepts and sensory reality and provided evidence for the validity of interpretation and deduction. He says: "I am not so presumptuous as to think that at my age... I have reached the summit of knowledge... when I have the opportunity to carry out all the experiments I need to support and justify my reasoning"¹⁴.

As far as methodology is concerned, the focus on methodology is a characteristic of the seventeenth century. Thinkers of the time realised that methodology freed them from the burden of submission to authority in general and in philosophy in particular. For example, according to Descartes, if we want to know about a triangle, we cannot know it by genus and specific difference, as Aristotle

¹³- René Descartes: Same source as above. Fifth part. Pages 57-58.

*Various books were written during this period which attempted to find rules to help the mind in its search and prevent it from falling into error. Examples include "The Improvement of the Spirit" by Spinoza, "Novum Organum" by Francis Bacon, "The Art of Thinking" by Pierre Bayle, and "The Search for Truth" by Malebranche.

¹⁴- René Descartes: "Discourse on Philosophy". First part. Translated by Othman Amin. Cairo: Publisher and Distributor, n.d. Page 46.

suggested. Instead, we can know it by understanding the relationship between its sides on the one hand and its angles on the other.

This indicates that Descartes established a new way of thinking that distances the human mind from following the ideas of others that bring nothing new. Moreover, he sought a new method to dismantle previous ideas and old opinions, to demonstrate the uncertainty of sensory knowledge, and to establish new ideas resulting from an effective method of research based on reason, taste and inclination, far from filling our minds with obscure ideas that we encounter here and there, especially knowledge related to the senses, because the senses deceive us, and this necessitates doubt and the search for certainty.

This necessitated the search for certainty and a new method, which Descartes saw as a cognitive tool and a scientific method. It replaces Aristotelian logic and includes a set of rules that he discusses in his works "Rules for the Direction of the Mind" and "Discourse on Method".

4-1 Definition of method according to Descartes: Descartes says: "By method I mean a set of simple and certain rules which, if strictly observed by anyone who follows them, will enable him to avoid error and to attain truth in all matters of which he can have knowledge, gradually increasing his knowledge in a continuous and orderly manner, without any mental effort being wasted"¹⁵. By this he means that the Method teaches the individual how to direct his mind to discover unknown truths, and that one must train for a long time to use and practise its rules. This is in contrast to the old logic, which presents ideas without any organising principle, where the truth of its conclusions is linked to the truth of its premises and vice versa. It is a continuous mental exercise, similar to physical exercise. To make this clearer, Descartes outlines its broad outlines in his works "Rules for the Direction of the Mind" and "Discourse on Method", explaining that the methodology consists of rules that help the individual, despite his weaknesses and limited life span, to gradually increase his knowledge and elevate himself¹⁶.

4-2 The nature of the Cartesian method: Descartes believes that man must rely on reason, or geometric reasoning, to elevate sensory knowledge to the level of truth, because the mind alone can perceive truth. This is the basic principle of the Cartesian method. For example, at first the earth appears larger than all objects, and the moon and sun appear larger than the stars. However, when we correct our visual error using geometric reasoning, we find that the Moon is smaller than the Earth and the Sun is larger than both the Earth and the Moon. This shows that our knowledge is not subject to the judgement of the senses. This is why Descartes mocks those with narrow minds who believe that there is nothing in the world except what they can touch¹⁷. The vessel that we think is empty is actually filled with air, which is a substance, and our hearts generate considerable heat but we do not feel it because it is normal, and so on. The point of these examples is to illustrate that not everything we do not perceive is non-existent. This led Descartes to see that method is what organises thought and reasoning, and through it we discover new truths.

¹⁵- René Descartes: "Rules for the Direction of the Mind". Translated by Sufian Saadallah. Tunis: Sarassar Publishing, Rule 4.

¹⁶- René Descartes: "Meditations on Method". First part. Page 4.

¹⁷- René Descartes: "The World or Treatise on Light". Page 66.

Thus Descartes moved from the question of "what is truth" to the question of "how to search for truth", emphasising the need to establish for ourselves rules to guide our thinking, rather than following others and falling into the errors of the senses. He detailed these rules in his book "Rules for the Direction of the Mind", which consists of twenty-one rules. In his Discourse on Method, he mentioned four rules: the rule of intuition, the rule of analysis, the rule of synthesis, and the rule of enumeration. Through these rules, he aimed to establish a comprehensive science that would apply to all fields of knowledge and serve as the source of all knowledge, stating, "I have come to believe that this science - mathematics - is superior to all other knowledge transmitted by man, because it is the source of all other knowledge"¹⁸. By this Descartes means that mathematics should be used as a mental exercise and a model of certainty, clarity and distinction.

Descartes based his method on mathematical intuitions as a means of obtaining certain knowledge. The proof of this is that his first rule was the rule of intuition, which expresses the authority of reason. According to this rule, one should not accept the knowledge presented by the senses, because they deceive us, and one should doubt all the knowledge we have previously received. Secondly, one should not rush to judgements before ensuring their certainty and clarity.

From this we can conclude that true knowledge is intellectual knowledge based on mathematical intuitions. Descartes said, "I accept nothing as true unless it is self-evident to me". This means avoiding haste and clinging to previous judgments, and only making judgments that are clear and unambiguous to the mind¹⁹.

The second rule is the rule of analysis, because only through analysis can the mind perceive things clearly and distinctly. Then, in the third rule, Descartes organises his thoughts from the simple to the complex in a logical order. He said: "To order my thoughts, I begin with the simplest and easiest to know, and gradually, step by step, ascend until I reach the knowledge of the most complex things. I even impose an order on things that do not naturally precede each other"²⁰.

Finally, Descartes arrives at the fourth rule, which is the final conclusion of the results obtained in the previous steps and the checking of all elements to ensure that nothing has been overlooked.

These rules are an explicit invitation to think and research with freedom and independence. It involves the critical examination of all beliefs and ideas that the mind has not tested for truth. For Descartes, this is the source of renewal and creativity. In addition to these rules, which embody Descartes' scientific inclinations, the method itself is a fundamental step towards the emergence of the new mathematical science that unifies all disciplines. It is also the primary goal that Descartes sought to achieve.

3-4 Mental actions: Descartes' method does not give direct commands and instructions to the mind. Instead, it is a self-effort that involves the mind submitting to itself and practising the discipline of relying on rules to guide its path towards truth and increasing knowledge. This is done through two mental actions: intuition and deduction.

¹⁸- René Descartes: "Rules for the Direction of the Mind". Rule 4.

¹⁹- René Descartes: Same source as reference 6. Second part. Page 22.

²⁰- Same source as reference. Page 22.

4-3-1 Intuition or Direct Knowledge: Intuition is the direct knowledge of an object without relying on experimentation and sensation. It grasps the nature of the object directly, without any barrier between them. This leads to a harmony between mental perception and the simplicity of the perceived object. Thus, knowledge becomes clear, intuitive and certain because it comes from a mind free from all constraints, whether previous ideas, differing opinions, or sensory and imaginative influences. Descartes says: "By intuition I do not mean the fluctuating testimony of the senses or the misleading judgement produced by an ill-regulated imagination. I mean the idea that the unclouded intellect of a clear and attentive mind forms, so simple and clear that there can be no doubt about what we understand"²¹.

Descartes urges us to use intuition in the best possible way, avoiding hasty judgements and cultivating good attention, patience and perseverance. With practice, intuition should become a habit and second nature, carried out with ease. According to Descartes, this can only be achieved if the mind has an affinity for simple truths, since the method itself involves breaking down complex problems into simpler ones that can be solved. The simple is easier to grasp and cannot be further subdivided.

By "simple truths" Descartes does not mean the categories and types found in academic science. Rather, he means clear, distinct and interconnected ideas that resist analysis. The function of intuition is to grasp each idea or the relationship between several ideas. This intuitive knowledge is characterised by certainty and the absence of error, because at this level of knowledge the mind deals only with simple truths, such as our perception of the relationship between the whole and its parts.

4-3-2 Deduction: on the other hand, refers to the process by which the mind proceeds from one or more propositions to another proposition that necessarily follows from them, or to infer things from other things. The propositions from which the mind proceeds are limited, which is why the certainty of deduction comes from the certainty of intuition. Deduction relies on intuition either directly, such as imagining a geometric shape with its right angle or semicircle, or indirectly, such as solving a quadratic equation. When deduction becomes lengthy, involving several propositions and stages, the mind relies on memory and deviates somewhat from intuition, making it prone to error. In such cases, checking and investigating both the relationships between propositions and the validity of the propositions themselves is necessary to achieve certainty.

This means that reducing complex problems to simpler ones that can be solved, and then using those solutions to solve more complex problems, requires two mental processes: analysis and synthesis, followed by organisation based on simplification to achieve certainty²². During these processes, the human mind must adhere to order and train itself to respect it. Descartes states: "We should distinguish the simplest things from the most complex, and examine them systematically in each series of things from which we derive other truths directly, so as to see their simplest elements and the relations, similarities or differences between them and other things".

The Cartesian method is to proceed directly from that which is less difficult or simple to that which immediately follows in complexity or difficulty, so that the mind becomes capable of proof, of

²¹- René Descartes: "Rules for the Direction of the Mind". Rule 3.

²²- Najib Bali: "Descartes." Cairo: Dar Al-Maaref, page 69.

attaining certainty, and of solving difficult problems. In order to achieve this goal, however, the mind must become accustomed to a series of actions and mental processes such as analysis, verification, statistics, order, and the avoidance of haste. These processes must be followed throughout the process of deduction in order to avoid error and uncertainty. This means that intuition and deduction are the only two methods for acquiring knowledge and learning sciences. Therefore, we must strive to be better able to use them with vigilance and accuracy²³.

5- Results:

An in-depth study and exploration of Descartes' method, its various principles and mental operations reveals to us the importance of this method and Descartes' interest in it. Various philosophers of Descartes' philosophy agree that this method contains the seeds of analytical geometry and the foundations of the natural sciences, because it attributes various natural or physical phenomena to mathematical and mechanical questions. It then leads these sciences to certainty by freeing the mind from various constraints that had bound it, represented by the whole of Aristotelian and Scholastic thought, as well as freeing it from deceiving the senses. With this method, Descartes achieved several goals that formed the cornerstone of his scientific project, which can be summarised as follows:

- A. To establish natural science, linking it to mathematics and separating it from theology.
- B. To achieve the unity of the sciences through their common subordination to the unity of the human mind, as he expressed it at the beginning of his book "Discourse on Method": "The mind is the most just and equitable thing that is distributed among men".

It is clear from this that the Cartesian method does not carry a metaphysical project, but rather establishes an integrated scientific project. This is evidenced by the fact that Descartes did not delve into metaphysics until after he had completed his books "Rules for the Direction of the Mind" and "Discourse on Method", except for the question of the existence of God, which he referred to in the twelfth rule.

Descartes' method spread throughout the history of philosophy and science through the so-called Cartesian revolution against Aristotelian logic, which he replaced with his own method of liberating the mind. This method questioned the reliability of sensory knowledge, as well as preconceived notions and received wisdom, and thus broke with previous thought, especially Aristotelian thought, which was blamed for the stagnation of human thought in general and science in particular because of its sterile cognitive patterns.

In the end, it becomes clear that Descartes, with all the knowledge and power at his disposal, tried to overcome the problem of the senses in his philosophy by developing various cognitive tools to uncover the errors into which our senses lead us and to reject their testimony. He then sought to elevate this sensory knowledge to the level of certainty and pure intellectual knowledge by abstracting matter from its sensory qualities and keeping it within its geometrical extension. This was done to provide the appropriate cognitive framework for linking physics with mathematical

²³- René Descartes: "Rules for the Direction of the Mind". Rule 6.

thought. However, Descartes could only achieve this after developing a new method that included rules to guide the mind towards certainty and away from error, whatever its form or content.

These methods, on which Descartes relied to solve the problem of the senses, laid the foundation for the emergence of pure mathematical physics, which became a fundamental pillar for the progress of science thereafter. This was observed in the work of later thinkers such as Leibniz (1646-1716) and Newton (1643-1727), among others, although there were reservations about the excessive use of geometry and reliance on reason.

Conclusion:

Descartes laid a solid foundation for a new cognitive system that was radically different from the ancient Greek ontological system. Through this system, he established a mathematical physics in which nature is transformed into a geometrical extension perceived by the mind, rather than relying on the deceptive and fallible senses. Therefore, everything we know about the external world through the senses must be rejected because it lacks any truth. Descartes provided numerous examples and arguments to support this view, ultimately claiming that sensory perception is not a reliable means of knowledge. Instead, he emphasised the reliance on intellectual perception. Consequently, Descartes' philosophy deals with the complex issue of sensory perception, leading to an investigation and analysis that begins with doubting the senses and questioning the reasons why their knowledge is not certain. He then goes on to study the nature of matter, which he understands as a geometrical extension, not in its sensory qualities. This geometric extension, grasped by the mind, serves as a proper basis for knowledge of the external world, rather than relying solely on sensory extension and its data.

Rather than leaving a gap between the natural world and mathematical thought, Descartes emphasised their harmony, which he attributed to God. He believed that the various mathematical truths found in nature were imprinted on our minds, and he established a coherence and harmony between them. With this idea, Descartes laid the foundation for innate ideas that allow the human mind to perceive the essence of things without relying on the senses, but rather using a new method with rules that guide the mind towards truth, certainty and the detection of any errors introduced by the senses.

In conclusion, according to Descartes' philosophy, knowledge of the sensory realm cannot be achieved by sensory means alone. It must be obtained through a rational and deductive process.

References:

- [1] René Descartes: "Meditations on the First Philosophy". Translated by Othman Amin. Cairo: Anglo-Egyptian Library, 1969. Meditation 1.
- [2] René Descartes: "The World or Discourse on Light". Translated by Emile Khoury. Beirut: Dar Al-Mankhoub Al-Arabi, 1999.
- [3] René Descartes: "Discourse on Philosophy". Part 2 in "Works and Letters", published by Gallimard, Paris, 1953. Paragraph 4.
- [4] Mohamed Hisham: "Philosophical Theory of Knowledge". Casablanca: East Africa, 2001.
- [5] Roger Texier: "Descartes the Physicist", published by l'Harmattan, 2008.
- [6] Galileo Galilei: "L'essayeur", quoted by Alexandre Koyré. Translated by Youssef Ben Othman. Tunis: Sinatra, 2008.

- [7] René Descartes: "Meditations on Method". Sixth part. Translated by Jamil Saliba. Algeria: Mawfam Publishing, 1991.
- [8] René Descartes: "Discourse on Philosophy". First part. Translated by Othman Amin. Cairo: Publisher and Distributor, n.d.
- [9] René Descartes: "Rules for the Direction of the Mind". Translated by Sufian Saadallah. Tunis: Sarassar Publishing.
- [10] René Descartes: "Meditations on Method". First part.
- [11] René Descartes: "The World or Treatise on Light".
- [12] René Descartes: "Rules for the Direction of the Mind".