

The inductivisme attitude in philosophy of sciences

النزعة الاستقرائية في فلسفة العلوم

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Abstract

The topic of this study addresses inductivism, which is a standard epistemological concept that stipulates the need to construct knowledge solely on the basis of a large number of observations and without prior ideas about reality, based on the method inductive. how to find a general law through a limited number of observations. Inductivism is based on two fundamental ideas: first, experience precedes theory and one must generalize from a limited set of observations. The second: science is actually made up of general laws.

Inductivism as a theory of scientific method goes back to Francis Bacon. He insisted on rejecting Aristotle's logic and called for a new tool for thinking as an alternative to Aristotelian reasoning, thus rejecting the closure of abstract intellectual reasoning. Bacon expressed the scientific spirit that prevailed in his era through his important work, the New Organon.

Keywords: inductivisme; general laws; experiment; theory; observations.

ملخص

يتناول موضوع هذه الدراسة النزعة الاستقرائية التي هي مفهوم إبستمولوجي معياري يقضي بضرورة بناء المعرفة فقط على أساس عدد كبير من الملاحظات ودون أفكار مسبقة عن الواقع اعتمادا على المنهج الاستقرائي، يتعلق الأمر بكيفية العثور على قانون عام من خلال عدد محدود من الملاحظات. تعتمد النزعة الاستقرائية على فكرتين أساسيتين: أولا التجربة تسبق النظرية، ويجب على المرء أن يقوم بتعميم من مجموعة محدودة من الملاحظات. ثانيا: يتكون العلم بالفعل من قوانين عامة.

وترجع النزعة الاستقرائية بوصفها نظرية في المنهج العلمي إلى فرانسيس بيكون. الذي أصر على رفض منطق أرسطو، ونادى باعتماد آلة جديدة للتفكير تكون بديلا عن القياس الأرسطي، رافضا بذلك الانغلاق في الأقيسة الفكرية المجردة. وقد عبر بيكون عن الروح العلمية التي سادت في عصره من خلال مؤلفه الهام الأورغانون الجديد.

كلمات مفتاحية: : إستقرائية؛ قانون عام؛ تجربة؛ نظرية؛ ملاحظات.

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1. Introduction

Talking about the inductive tendency is linked to talking about the mechanical tendency and what it produced in the field of science and philosophy, as in the second half of the sixteenth century, scientists' view of the universe began to change. A number of astronomers appeared who followed Copernicus' research and widely disseminated his theory after adding some modifications and reforms to it. Among these are Kepler and Galileo. Kepler supported what his predecessor Copernicus decided that the sun is the center, not the Earth. He presented new evidence for this theory and confirmed that the universe moves as a complete body with mechanical movement. Galilei also announced his adoption of the Copernican theory and stated that the Earth rotates. In the end, the emergence of classical mechanics was a decisive stage in the development of science. Mechanics in general is a philosophical approach that works to differentiate between matter and force, and attributes all changes to movement. It is understood from this definition that the mechanical tendency is a transgression of the classical metaphysical interpretation, which was conceived by Aristotle and dominated medieval thought, because the mechanical theory is based on the statement that all phenomena and events that occur in the universe are connected to each other in a higher way, and in this way the existing relationships between things are linked. By the laws of motion. In the seventeenth century, the mechanical conception turned into a model of interpretation or a "paradigm."

Which imposed itself on minds, and its standards and standards became the standards and standards guiding all research in nature (Salem Yafut: 1989, p. 101). It was the fate of the French philosopher Descartes to be the first to put this intellectual revolution in its most complete form, because Descartes was of a mechanical tendency. Even if he said that there are two degrees of existence, mind and matter, the truth is non-rational and goes back to the concepts of mechanics (A. M. Bushinsky: 1992, p. 24.) He represented everyone and spoke on behalf of the prevailing philosophy of science. On the other hand, the philosophers of the experimental doctrine in England were moving in a more logical path. They accepted the mechanical doctrine, which was consistent with their experimental orientation. The mechanical tendency rejects the study of phenomena based on the school curriculum based on theoretical measurement, and insists on adopting observation, experiment, and mathematical calculations. Thus, it paved the way for the emergence of the inductive tendency of Francis Bacon and the experimental philosophers who followed him.

Therefore, the question that arises is: What is the concept of inductive tendency? What is her vision of science and the philosophy of science?

2. Inductive attitude

In the linguistic sense inductive is derived from experimental induction.

In the conventional sense: inductive epistemology is a point of view through which given inductive procedures lead to correct scientific issues (research into causes and laws), and this has been in the history of science since the era of Francis Bacon (Louise-Marie Morfeaux : 2005, P 266.).

The inductive tendency expresses the beginning of a new phase in the history of the philosophy of science in the seventeenth century, with the emergence of English empiricism, which rejected the method of rational deduction in studying and interpreting nature, and replaced it with the method of observation and experiment. Donald Glaze describes it in his book *The Philosophy of Science in the Twentieth Century* as: “a theory of the scientific method before the twentieth century”. (Donald Gillies: 2009, p. 91) From this definition, it can be said that the inductive tendency is a point of view derived from the inductive method, which attempts to take the reference of experience in every matter. Organized scientific research.

The inductive tendency as a theory in the scientific method goes back to Francis Bacon. Who insisted on rejecting Aristotle's logic, and called for the adoption of a new machine for thinking that would be an alternative to the Aristotelian analogy, thus rejecting isolation in abstract intellectual analogies. Bacon expressed the scientific spirit that prevailed in his time through his important book: “*The New Organon*” (Maher Abdel Qader, 1984, p. 95.) Bacon chose this title because Aristotle's writings on logic were collected under the title of the *Organon*. The aim of this is to undermine the foundations of the Aristotelian method. Accordingly, the new *Organon* is divided into two parts:

Part One: *Cash*; Through it, Bacon criticized the rational approach that prevailed before him.

Part Two: *Constructive*; Where he sought to build a new approach, alternative to the traditional approach, which is represented by the inductive approach in the first part, in which he explained the mistakes made by previous people in the study of nature when they relied on Aristotelian logic. The Aristotelian analogy consists of two premises and a conclusion, and the premises do not express facts related to the world of experience, nor does the conclusion.

Bacon felt that science had become stagnant, by relying on this approach, which is based on theoretical thought and not on realistic observation. Logical analogy is sterile in all its aspects, because no matter how carefully one looks at the conclusion and research, it remains within the framework of the premises that we accepted from the beginning. Bacon found that this type of thinking is not suitable as a starting point for scientists to discover the laws of nature. In this context, Bacon strongly criticized medieval

philosophy for following Aristotle's approach to studying nature, and attributed common errors in swimming to what he described as idols or illusions. Therefore, it is not surprising if he called for the destruction of these idols, which control the minds of scientists and thinkers, and this is in order to establish For scientific knowledge based on a sound approach, Bacon defined idols into four types:

- 1- Tribal idols: They are general to the human race, and seem to tend to establish an order for the world before confirming its existence in nature itself through direct observation. They are a human phenomenon similar to a false mirror that corrupts shapes and images. The mind only accepts what agrees with them and does not pay attention to what opposes it, even if it finds an anomalous situation and introduces it in any way into the system of the supposed world.
- 2- Idols of the Cave: They are represented by the great influence of the environmental factor, its components and culture on the human mind, so he imagines their humble things as if they were absolute truths (Youmna Tarif Al-Kholy: 2017, p. 70) Bacon decides that the circumstances and circumstances of life surrounding the individual, and certain personal characteristics such as the cultural level and social environment; All of this confines the individual to a specific framework of thinking, a type that is common among many thinkers. Aristotle returned all the sciences to logic because logic revealed Aristotle, and Plato made the sciences branches of divine knowledge.

Market idols: These are due to the incorrect use of language words, and they occur as a result of the use of language in exchanging ideas and opinions between people in markets, cafes, etc. They speak in various matters of life in a common language that is far from logic. Which leads to the language losing its true meaning. Bacon warns of the danger of using language in scientific research inaccurately (Mahmoud Fahmy Zidane: 1977, p. 64.)

Idols of theatre: What is meant by the mistakes that seeped into the souls of people from different philosophical schools of thought (Abd al-Rahman Badawi: 1984, p. 395)

- 3- which arose as a result of being influenced by people and philosophy such as Aristotle, so people received the opinions and positions of intellectual schools and famous scholars without doubting their validity. Therefore, people receive opinions and ideas from scholars just as viewers receive opinions from actors in the theater.

These are the illusions that Bacon warned against, and called for the need to be freed from them in order to reach the truth. This leads us to the positive aspect of Bacon's approach, which is represented by induction, which should be directed to nature. To understand phenomena through observation

and experiment. Induction during application and practice is divided into two stages:

The first stage: consists of the three-list stage:

The three lists include:

First: Attendance list; In it, the researcher lists all the cases in which he observed the phenomenon through experience.

Second: Absence list; In it, the researcher records cases in which the phenomenon is absent.

Third: List of differences in degree; The researcher includes the varying degrees of occurrence of the phenomenon.

The second stage: represented by Baconian induction; This is the stage of deletion and exclusion, and this is through conducting the decisive experiment, and here Bacon decides two things:

The first: It is necessary to exclude the common law if there is a negative case that denies it, regardless of the number of cases that confirm it.

Second: The validity of public law can be confirmed by invalidating and denying all laws and theories that conflict with it.

It can be said that the issue of confirming laws is due to decisive experience; This is a necessary step in the inductive approach. Whenever there is a set of hypotheses, the decisive experiment ultimately remains only one, and the rest of the hypotheses that did not stand up to experimental testing are eliminated.

On this basis, Bacon developed a method that leads to an expansion of knowledge of the natural world (Donald Gillies: 2009, p97). This approach was used, but in different ways, while maintaining its general framework, known as the inductive tendency. Which communicated with later generations of scientists such as Newton (1643-1727) and John Stuart Mill (1806-1873).

Newton undermined Cartesian physics, which was based on the deductive method, and laid the foundations for inductive physics without denying the role of mathematics in physics. Newton was asking theory to help him calculate the numerical values of natural phenomena accurately, and then he resorted to experimentation to ascertain whether naturalism presented those phenomena with the same accuracy. He wanted the theory to be comprehensive, accurate, and the strongest expression of the facts of experience (Muhammad Abed Al-Jabri: 2006, p. 272.). Therefore, experience is the touchstone that decides the fate of the hypotheses that the scientist creates through his observations of phenomena. Therefore, Newton changed the Cartesian approach. If Descartes aimed to reach certain and accurate physics like mathematics, he said: "I do not accept any laws in physics other than those in geometry and abstract mathematics because all natural phenomena can be explained through them" (James Gies: 1942, p. 148.), meaning that physics must be built on the mathematics model. Because it is the most accurate and

certain science, and physics for him should be characterized by certainty because he rejects probabilistic knowledge. In this regard, Newton's goal was the opposite; That is, it starts from hypotheses extrapolated through observation and ends with mathematical calculations.

The truth is that Newton's method is the most wonderful example of the modern method. Observational data are the starting point in the scientific method, but they are not exhausted by this method, but rather complemented by mathematical interpretation (Hans Reichenbach:, 1962, p. 97). The difference between Newton and Descartes does not stop there, but rather reaches the point of Newton rejecting the four rules set by Descartes for establishing rational knowledge and replacing them with new rules:

- 1- Only those reasons that appear necessary to explain nature should be accepted; This means ruling out explanations, hypotheses, and metaphysics.
- 2- Results of one type should always, whenever possible, be conducted for the same reason. In this rule, Newton's acknowledgment of the principle of determinism appears, which he sees as absolute and which justifies the prediction of its occurrence.
- 3- The qualities contained in things, which do not accept increase or decrease, and which we observe in all bodies that we can experiment with, must be viewed as qualities that generalize to all bodies in general, and the properties of bodies and their quality are known only through experience.
- 4- In experimental philosophy, that is, physics, the issues deduced from phenomena must be viewed, despite counter hypotheses, as completely true or close to true, until they are completely confirmed by some other phenomena (Muhammad Abed Al-Jabri: 2006, p. 272.)

The difference between Newton's physics and Descartes' physics confirms the strong presence of the inductive tendency in the natural sciences curriculum, as this tendency has become more embodying the spirit and mentality of the age, as the characteristics of this tendency have become more clear after the decline of the star of Cartesian physics.

However, talking about the inductive tendency through the approach of both Bacon and Newton is not enough to define and clarify this tendency; This requires explaining its most important features through applications and principles of the inductive approach.

The basic idea on which inductivism is based is; It is that science begins from observations and moves from them to generalizations, laws, theories, and predictions (Donald Gillies: 2009, p97), because observation is a basic step in the inductive method, with which scientists begin and with which the experiment, which is considered an artificial observation, ends. Therefore, the inductive tendency replaces theoretical contemplation with observing facts and

incidents in nature, then extracting the laws and generalizing them so that scientists can predict and anticipate. This is what made Poincaré view science as inductive in the first place. That is, it is based on generalization from observation of the particles in the world. But the question that arises in this regard is what is the justification for this generalization? What guarantees its health in the future? The inductive tendency is based on two principles upon which the inductive process is based:

The first: belief in the principle of causality, which stipulates the causal sequence of natural phenomena.

The second: The principle of the continuity of events: It is a well-established principle among scientists that stipulates that the phenomena of nature are always repeated steadily, that is, on a regular basis. Denying this principle leads to belief in the idea of irregularity and chaos, which is a belief that reason rejects. That is, the events of nature occur steadily, at the same pace that does not change. That is, what happened today will happen tomorrow and forever. Belief in the regularity of natural events is a belief that everything that has happened or will happen is a case of a general law that does not accept exception. The regular repetition of natural phenomena that does not change is the permanent feature of nature, and it is the feature that scientists believe in and call it the principle of consistency or regularity.

These two principles are based on the scientific laws and theories that explain nature. Causation and the regularity of events in nature constitute the safety valve for induction and the source of absolute confidence for the inductive tendency, in the explanations it provides and the events and phenomena it predicts, and this is based on the belief in the existence of an absolute inevitability according to which the universe operates, and this is what Newton called for in his physical and astronomical theories.

This justification provided by the supporters of the inductive tendency was not sufficient to convince its opponents who questioned the validity of inductive generalizations and predictions, which led to the undermining of the inductive tendency. How was this done?

3. Criticism of inductivisme

Talking about criticizing the inductive tendency begins with induction and the doubts that were raised about its credibility as a scientific method, which began with David Hume, whose research was based on the principle of causality. He wondered about the possibility of justifying induction by justifying the principle of the progression of events, which proceeds from partial observations to generalizations that include phenomena. In the future. This is known as the problem of induction raised by Hume. What is this problem?

3.1 The problem of induction:

This problem relates to the most important principle on which induction depends, which is the principle of the continuity of events in nature, as induction, in its transition from the part to the whole, is based on the belief that what will happen in the future is similar to what happened in the past, and here Hume distinguishes between two types of knowledge: the first: related to mathematics issues, and the second: related to reality.

For the first: such as the sum of the angles of a triangle, 1800. And multiplication, subtraction, equality...etc.

These propositions, which are of this type, can be derived by applying thought alone without submitting to anything that exists in the world (David Hume:, 2008, p. 50).

. Therefore, mathematical propositions are necessarily necessary from a set of definitions, and they cannot be falsified.

To say that mathematical propositions are necessary is to say that they are correctly deduced from their premise; It is a result of achievement, and the condition for its validity is that the premises do not contradict the results, and this is what makes mathematics results characterized by stability and absoluteness.

As for the second type of knowledge, it relates to issues of reality, which differ from the first type in that it results from inductive generalizations, and this is what we find in experimental sciences, as their truth does not depend on conclusion, and this is what also makes its opposite possible. That is, its truthfulness and its absence are equal in possibility. "The proposition "The sun will not rise tomorrow" is no less plausible and does not involve any more contradiction than the proposition "It will rise" (David Hume:, 2008, p. 50).

After Hume clarified the difference between issues of reality and issues of mathematics; He wonders about the justification for believing in the truth of propositions, as he says: "It may be interesting, then, to search for what is the nature of the structure that makes us rely on any real existence or any reality beyond the testimony of our present senses."

Hume's answer was to believe in the existence of a relationship between cause and effect, or what is known as the principle of continuity of events, this structure that guarantees inductive generalizations, but when Hume searched for the basis of this principle, he found it based on experience, and therefore it does not depend on rational proofs.

However, knowledge of this relationship cannot be obtained from a priori explanations. Rather, its effects are born from experience; Where we find that certain things are consistent with each other on an ongoing basis, it is a general issue that does not accept any exception (David Hume:, 2008, p. 52).

This means that the question of justifying induction is not possible; Because in this case it revolves in a vicious circle, as induction depends on the

principle of regularity of events to justify its generalizations, and the principle of regularity of events depends on induction.

Hume's position on the principle of uniformity of events on which inductive inference depends is that it cannot be proven a priori; We do not know what the premises of that proof are, and we cannot prove the principle with sensory experience. Any attempt at proof is tantamount to falling into the role, that is, accepting what you want to prove (the justification for induction).

What is worth noting is that, in raising the problem of induction, Hume did not intend to undermine dispositionalism; Rather, he wants to find a solution to this problem. That is, he tried to justify generalizations of induction based on partial observations. This is on the one hand; On the other hand, his inclusion of this topic related to the criticism of the inductive tendency, through which he aims to clarify the historical context of the criticisms directed at the inductive tendency. Because the problem that Hume raised about induction caused confidence in his generalizations and laws to be shaken, and this reflected negatively on the inductive tendency as a theory in the scientific method, and this appears in the objections directed at it after Hume, and this will become clear through Pierre Duhaime's criticism of the inductive tendency.

3.2 Duheim's criticism of inductive attitude:

Duheim's objections to the inductivism of his criticism of Newton's theories and laws; This is because Duhaime views the inductive tendency as a Newtonian method. In his book "Physical Theory, Its Subject and Structure," Duhaime devotes two sections from the sixth chapter in the second part to criticizing the Newtonian method, where he says: "The physical theory that Newton called for in a general footnote, which culminated in the book of Principles." He strongly rejected in natural philosophy every hypothesis that was not derived by induction from experience, when he affirmed that in correct physics, every proposition must be derived from the phenomena and then generalized by induction (P. Duhem 1906, p154).

It is clear from all of this that Duheim views induction as a Newtonian method; It excludes all rational and metaphysical hypotheses, that is, those that are not based on observation and experiment. Thus, Newton acknowledges induction as he defined it in the fourth rule that was explained in the previous section. But the irony lies in Newton not following induction, especially when he discovered the law of gravity based on the reason for Kepler's laws.

Duheim described induction as a Newtonian method, but Newton did not follow it when he established the system of universal gravitation. His theory of gravity was not derived from the laws revealed by Kepler's observations, the law that transformed dubious rational inferences into generalized results by induction (P. Duhem 1906, p154).

- 1- Kepler's laws are not mythological, metaphysical, or religious hypotheses, nor do they include an experimental investigation based on observation and experimentation. Rather, their realization is based on the consistency of mathematical interpretation and the tightness of the transition from the premises to the results (Abdel Fattah Mustafa Ghanimat, 2009 p. 36). Thus, Newton's actions contradict his words. This is because he insists on the necessity of relying on experimental induction, while in his works he relies on Kepler's deductive laws. This is what made the inductive tendency rely on the conclusion that it initially rejected, in order to rely on induction. Newton says in his book *The Mathematical Principles of Natural Philosophy*: "But I was not able to discover those properties of gravity from the phenomena, and I am not a hypothesis, because what was not deduced from the phenomena is only hypotheses, and hypotheses have no place in experimental philosophy, whether the hypotheses are metaphysical or physical." Whether they are hypotheses based on hidden, unknown qualities or mechanical properties" (Mahmoud Fahmy Zidane: 1977, p53). In that philosophy, partial issues are inferred from phenomena, and then they become general issues by induction.

For him, hypotheses are excluded from experimental philosophy, because they are speculations that were not inferred by induction from phenomena, and as long as they are like that, they cannot be made into general laws. This clear contradiction between theory and practice according to Newton shows the weakness of the position of the inductive tendency, and this can be attributed to several reasons, the most prominent of which are:

A - The confusion between induction and deduction in the seventeenth and eighteenth centuries. This is what Lakatos emphasized when he said: "There was no clear distinction between induction and deduction in the seventeenth and eighteenth centuries... Induction and deduction were synonymous terms for some thinkers." (Donald Gillies; 2009. P213).

B - Another reason related to the problem of induction raised by Hume is that induction lacks a logical or realistic justification for the generalization, which made Newton and some thinkers of the inductive tendency rely on deduction to give a logical reason for the generalization.

But whatever the reasons that made Newton rely on the deductions made by Kepler in formulating the law of gravitation; This indicates the inability of induction to contain nature in the form of general laws, and hence the weakness of the inductive tendency, which in turn will lead to the emergence of multiple tendencies in the philosophy of science.

What is important in this context is Duheim's criticism of the inductive tendency represented in Newton's approach; It is his assertion that Newton's laws did not come about as a result of inductive generalization from

phenomena, as Newton stated in his book, "Principia"; Rather, the basis of its laws are Kepler's deductive laws. For example, Newton's first law of motion, from which he arrived at the principle of gravity, we find that this law states the following:

The whole body continues in the state it is in of rest or steady motion unless some force forces it to change that state; This is known as the law of "inertia".

Based on this law, every planet remains in its movement around the sun at a regular speed unless its gravitational force interferes with its normal path, which is what Newton calls the gravitational force.

About the source of this principle, Duheim asks. Can it be said that Newton deduced the law of gravitation through induction of phenomena? Is this principle of universal gravity merely a generalization of two interpretations provided by Kepler's laws and their extension to include the movement of the moons? Can induction (the law) be derived from these two interpretations? Then he answers, saying: "No, in fact, it is not possible. This law is not more general than these two interpretations. It is not homogeneous with them, and is even contradictory to them"(P .Duhem : 1906, p156).

In this aspect, Newton believes that Kepler's first law states that the planet's orbit is elliptical and the sun is its center, while Newton's law of inertia makes it elliptical in a way of disorder, due to the presence of the gravitational force of other bodies and planets, and this is what Duheim explained in his saying: "The principle of general gravitation, far from being derived by general induction from Kepler's laws formulated from observation, is in contradiction with them formally. If Newton's theory is correct, then Kepler's laws necessarily become wrong." (P .Duhem : 1906, p156, 157). This logically follows that Newton's theory cannot be derived by induction or even by deduction from Kepler's laws. If we assume otherwise, we will have an example of arriving at a conclusion from logical premises that contradict this result, and this seems absurd.

Duheim then concluded by asking the source of the certainty of Newton's theory, saying: "If the certainty of Newton's theory does not stem from the certainty of Kepler's laws, how can this theory prove its validity?" It responds to the approximations of improved algebraic methods by constantly perturbing the perturbations that remove each planet at each instant from its orbit assigned to it by Kepler's laws, and then compares the computed perturbations with the perturbations observed by the most precise instruments and precise methods." (Youmna Tarif Al-Kholy: 1989, p. 139) Thus, Newton's theory, which he explained in his book Principles as inductive, is no longer so, but has become deductive, and this is due to the inability to generalize partial observations and move from them to laws, theories, and predictions, which is the main idea on which the inductive tendency in science is based.

Despite his views, Du Ham's criticism is limited because he limited it to Newton's approach. After Duheim, many criticisms of the inductive tendency appeared, perhaps the most important of which was Karl Popper's criticism in his book *The Logic of Scientific Detection*. What is Popper's view of inductive tendency?

3.3 Karl Popper's criticism of inductive attitude:

Karl Popper objects to inductivism; Through his refutation of her claim that science begins from partial observations to arrive at general laws and theories through induction, this is because Popper refused to begin with observation without a prior background, and he emphasized this in several places; He began one of his lectures in Vienna by asking physics students: By holding a piece of paper; Then they should observe carefully and accurately and record what they notice. Of course the students wondered what he wanted them to notice. The phrase "observe" means nothing (Karl Popper:, 1959, p. 123.).

From this example, the observation must have a prior subject to target, and this is what made Popper disagree with the inductive tendency regarding the primacy of theories over observations. Popper gives priority to theories over observations, as he says: "On the contrary, theories are prior to both observations and experiments, meaning that observations and experiments have no importance except for theoretical problems" (Mahmoud Qasim: 1986, p. 203). Although the belief that science progresses from observation to theory is still valid, it is a belief that is far from correct, as there is no pure observation. The evidence for this is that it is not possible to start from pure observations, as observation is always carried out in a selective manner, and when observation is done it is for a limited goal and destination. Certain view (Karl Popper:, 1959, p. 123.)

Therefore, we wonder about Popper's position: What is the role of observations in scientific theories? Popper answered that observations and experimentation have a secondary role, as they are a means of falsifying the theory and canceling it by revealing the errors present in them, as he says: "...observation and experimentation help us to eradicate theories by showing where the error lies in them"(Karl Popper: 1984, p. 65).

After observations were the starting point for scientific discovery for the supporters of the inductive tendency, they became with Popper a subsequent means of implementing theories. This change in the order of the steps of the scientific method leads to another very important point for him, which is his rejection of the principle of induction, which the inductive tendency considers a sufficient justification for inductive inferences, and his rejection This principle is represented in his denial that it is a pure logical truth, and he confirms this in his saying: "Now, this principle of induction is not a purely logical truth like the attainment of a result or the analytical proposition.

In fact, if there were such a thing as the pure logical principle of induction, then there would be no problem for induction. Because in this case, all inductive inferences will be able to be viewed as purely logical, like deductive logic inferences, and hence the principle of induction is a compositional issue; Any issue whose denial does not become self-contradictory(Karl Popper:, 1959, p. 65)

In the context of his criticism of induction, Popper reaches the same conclusion that Hume reached; This is because the question about the justification of inductive inferences leads us to the principle of induction, and if we ask about the justification for this principle, the inductivists' answer is limited to inductive inferences and thus becomes in the endless cycle, which made Popper deny the existence of any justification for induction when he says: "... because the principle Induction, in turn, must be a universal issue, and therefore if we try to consider the truth of this principle as known from experience, the same problems that accompanied its introduction will arise again, and in order to justify the principle we must use inductive inferences, and in order to justify those inferences we must To assume an inductive principle of a higher level, and thus the attempt to establish the principle of induction on experience is destroyed because it inevitably leads to an infinite regress (Karl Popper: 1959, p. 123.).

As long as induction is unjustified, it cannot lead to the discovery of theories. It is not suitable as a method for advancing science, because it does not give us proof of the validity of future generalizations and predictions. For Popper, induction is redundant and rejected, whether it is a method or a principle, and he declares this in his saying: "Therefore, I do not believe in what is called the generalization method. I mean saying that science begins with observations from which it derives its theories in a way of generalization or induction" (Youmna Tarif Al-Kholy: 1989, p151).

This was Popper's position on induction; About the method or principle, by completely rejecting both of them, saying that they are incompatible with the way the world grows and advances. Moreover, Popper's criticism did not stop at the inductive approach only. Rather, he moved to affect some of the scientists and philosophers who belonged to the inductive tendency. He strongly criticized Newton's theory, and showed that it was not the result of induction, but rather its origins go back to Kepler. Newton used the deductive method, despite his assertion that his theory was the result of experimental induction. Popper's criticism of Newton's theories is very similar to the criticisms directed at him by Duheim, as they both emphasized the bankruptcy of the inductive tendency represented in the Newtonian method. The clearest example of Popper's criticism directed against Newton: A comparison between the properties of Newton's theory and the properties of inductive observation is as follows(Youmna Tarif Al-Kholy: 1989, p158).

Observation phrases	Newton's theory
It can't be accurate.	Extremely precise: How to derive extreme precision from imprecise ones.
It is under certain conditions, and any observed situation must a priori be specific.	It is supposed to be general, and applied in all possible circumstances, like the law of gravity, not only on Earth, but in all places, even those that have not been observed.
Observation is in kind and private.	Theory is abstract and holistic.

Through the process of comparison, it appears that the characteristics of the observation that Newton claimed was the source of his theory are completely different from his theory, and this indicates that Newton did not use induction in his research and studies. As for Popper, his failure to use induction is due to his inability to reveal scientific laws and theories. Which leads his supporters to abandon him.

Popper's criticism continues to reach the father of the inductive method in the modern era, "Bacon," who did not bring anything new, and for him induction is nothing but an old imitation of the Socratic method known as the method of generation and sarcasm. If Socrates used the method of sarcasm to ask questions and destroy previous beliefs and then used generation in order to build alternative correct knowledge, then Bacon carried out the same procedure in his book *The New Organon*, which contains two aspects, the first of which is negative, represented by the theory of idols, which he called for their destruction, and the second aspect is positive. It consists in presenting his new method called induction, through which he wanted to build sound scientific knowledge. In this regard, Popper sees: Baconian induction is the same as Socratic generation. Both of them mean preparing the mind by purifying it of biases, so that it can recognize the clear truth and read his book *Nature* (Younna Tarif Al-Kholy: 1989, p151, 158). Moreover, Popper considers Bacon's approach to be the same as Descartes' approach. The doubt with which he began represents the negative side, and the stage of certainty represents the positive side for Bacon. So where is Bacon's new revelation if it does not go beyond the approaches of his predecessors?(I. Lakatos, 1994,P187.) Lakatos points out that the ambition of the inductive tendency based on induction during the seventeenth and eighteenth centuries was that induction could support scientists with rules that included mechanisms to address all the problems they might encounter, but this ambition was not achieved. Modern scientific curricula have come to include only rules of steps and principles that are not always precise as expected, and their function is to evaluate coherent and harmonious theories. As for the purpose of these rules

and verification systems as a result of scientific rationality, it is to work on creating standards that are used to define the concept of science and concepts related to scientific knowledge. Outside the scope of the legislative authority of these rules, it is only possible to talk about an empirical sociological psychology of detection.

The failure of induction to determine the rules that must be observed for the sake of the desired scientific development, and its function being limited only to evaluation, is no longer a scientific discovery that can be achieved today. Perhaps what inspired this idea to Alakatosh is the failure of the inductive tendency and its failure to define and chart a path for scientific theories, and this is due to its lack of interest. The history of science itself.

There is no doubt that the inductive tendency was one of the most influential epistemological tendencies, and according to it, we can only accept in the field of scientific knowledge the type of propositions that describe established facts or those that lead to confirmed inductive generalizations. Based on fixed partial facts; The inductive does not accept any proposition unless it is experimentally confirmed to be true. Otherwise, he does not acknowledge its scientificity, so his scientific rigor is severe. A scientific issue should not be scientific unless it is confirmed by concrete reality or derived from other scientific issues that have previously been proven? (I. Lakatos, 1994,P187, 188) From here, epistemological and logical dilemmas emerge, similar to every methodology, facing the inductive tendency, as long as it is based on the stability of the validity of realistic issues and the rigor of inductive inferences, and since the supporters of inductivism do not care about the history of science; If they encounter something that does not fit their standards, the research does not prompt them to try to start the overall project of science anew?(I. Lakatos, 1994,P188.). It is not unlikely that some of them will initiate proposals for ineffective solutions to these problems, and they will also attempt to rationally re-establish history without intending to and without awareness of the logical flaw and epistemological fragility of their approach?(I. Lakatos, 1994,P188.)

In this regard, the inductive historian only acknowledges two types of scientific discovery, which he believes is the only legitimate and original discovery. The first: relates to issues containing strict facts. The second: relates to inductive generalization, and these are the only issues that, for him, constitute the essence of the internal history of science. When he records... History: These issues are what it searches for, and when history finds them, it can begin building its impressive pyramids?(I. Lakatos, 1994,P189.) What about scientific revolutions? How do you read them from the perspective of inductive tendencies?

Historians do not deny inductivism; The occurrence of scientific revolutions whose essential function is to uncover errors, which must

necessarily be eliminated from the history of science and classified within the history of false human knowledge or within the history of delusional and naive beliefs, which are not related to science, which means that the moment of the birth of science in the true sense was only recently. In this way, scientific development begins with every scientific revolution, current or recent. In this context, it must be noted that each particular science has an internal history that records its achievements and successes: “The basic models for the history of science for the inductive historian are all the generalizations made by Kepler based on Tycho Brahe’s precise observations, and Newton’s formulation of the law of gravitation, which is also an inductive generalization of his observations about Electrical currents. The same is true for modern chemistry; It is viewed by historians of the inductive tendency as having only really begun with Lavoisier's experiments and the correct explanations he provided.

According to Lakatos, The inductive historian cannot give an internal rational explanation for the motives that led to the selection of certain facts instead of others. According to his point of view: this choice is irrational, but rather an external empirical one, and this is what makes the inductive tendency compatible with many empirical theories, related to the selection of problems that are consistent with the Marxist perception, for example, which believes that the selection of problems is linked to the requirements of society, to the extent that some Marxists They liken the major stages of the history of science to stages of material development. ?(I. Lakatos, 1994,P189.)

However, Lakatos sees this orientation towards external factors in their sociological aspect as unnecessary, because it is possible that selection is the result of intellectual, not material, factors that exist beyond science itself. “It is likely to be determined by post-scientific mental factors” (). Within inductivism falls a form of inductivism that Lakatos calls extremist; It rejects all factors external to science, whether metaphysical, psychological, or sociological. Because it is: “An unacceptable deviation: the strict inductives only accept a selection made (by chance) by the mind of a blank slate, making the strict inductive tendency, in turn, a special form of internalism, and according to this doctrine; Once the presence of external factors is confirmed the acceptance of a scientific theory. This statement must be withdrawn: proof of the existence of an external factor means its invalidation.

Since external factors remain entrenched and difficult to eradicate, we can only consider the extreme inductive tendency as a utopian doctrine, as a theory of rationality that is self-destructive (lakatos, 1994, p-189). When the hard-line historian of inductivism asks what causes some world famous people to overestimate metaphysics, or why they believe their creations were good when they are strange and irrational to inductivism, he answers with what proponents of inductivism call the problems of false consciousness that go back to It has its origin in psychological pathology, that is, it goes back to

psychological diseases, and this is precisely the external history of science for the inductive historian.

These criticisms limited the scope of inductive tendencies, and made it retreat from the position it occupied in the philosophy of science, especially after Newton's achievements

6- Conclusion

From the above it can be said: The inductive tendency represented by Bacon and Newton focused on the experimental inductive method, which aims to generalize results based on the study of partial cases, and this is what made scientific certainty questionable, especially with regard to the justification of induction, which led to the use of the hypothetico-deductive method, and this is what Newton did. This led to a contradiction between what he said and what he did.

The contradictions produced by the inductive tendency in the philosophy of science opened the door to criticizing it and undermining its foundations. As a theory of the scientific method, this means a lack of confidence in induction as a means of understanding and explaining phenomena.

Likewise, the criticisms directed at the inductive tendency by Duheim and Popper showed the extent of the bankruptcy of this tendency. This was among the reasons that led to a radical revolution in scientists' vision of science and the scientific method. Experimental induction, which was considered the only method of science, is no longer the case. Induction must be coupled with mathematical deduction. After observation was the first step in induction, it must be guided by a preconceived idea or hypothesis. After the decisive experiment, in the Baconian sense, was a means of verifying the validity of hypotheses and separating scientific theories, the experiment became nothing but a means of knowing appropriate and simple theories. That is, the criterion for accepting a scientific theory is not experimental verification, but rather the extent of suitability and simplicity of the theories compared to other theories.

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