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Inductive Investigation of Nature in Traditional African Culture

Abstract

This study is an inductive approach to investigating and acquiring knowledge of nature in African culture. It begins, without any assumption of foreknowledge, but without any overindulgence, with a brief exposition of the meaning of induction. It analyses, defuses and rejects the attempted arguments made recently by some scholars that induction is not a part of the African reasoning faculty, that it is western exclusive and that most traditional beliefs are irrational, superstitious and non-inferential. It continues with a brief analysis of the African engagement with inductive reasoning, and thereafter, connects induction and the natural environment by concretely analysing some ways the African understands and acquires knowledge of the natural environment through inductive reasoning particularly in traditional African society. It made a demonstrative inquiry into these ways with medicine, agriculture, science, technology, time, and season, among others, and how such thought patterns and the resultant knowledge informs the African beliefs and practices. The study concurrently argues that the African inductive understanding of nature is a demonstration of the inductive creativity, skill and competence of traditional African people. It concludes by arguing that if it is established that the traditional Africans acquire knowledge of nature inductively and shows how this knowledge is acquired, it would concurrently have been established that Africans are capable of inductive logic, whose components includes inferences and rationality. The study adopts the conceptual and critical methods of philosophical analyses.

Keywords

traditional African, induction, (ir)rationality, superstition, inductive acumen, natural environment, induction of nature

Introduction

This study is an inquiry into an aspect of the logic of understanding nature in African traditional cultures. It explores an aspect of African traditional thought system about which due emphasis has been ignored. It attempts to blend inductive logic with the natural environment by analysing how induction aids

human understanding of the natural environment. The logic of environment, as used here, refers to the reasoning pattern of inquiring into, understanding, and interacting with the natural environment.

Human beings attach value to different kinds of environmental experiences; such experiences may vary across cultures. This implies that humans across cultures think, “understand and relate to their natural environments in different ways” (Mathews 2014: 544). The part of environmental experiences which this study focuses on is the inductive logic of the natural environment. Specifically, the study examines how inductive reasoning aids human understanding of nature in indigenous African society. As Freya Mathews argued, the influence of indigenous thought or cultural knowledge on the environment in some parts of the world is arguably tremendous and profound. While the study rejects the views which deny African people or their beliefs of inductive engagements, capacity, inferences, and rationality, it argues that induction is an inseparable part of the African system of thought. It attempts to demonstrate this African inductive initiative by showcasing how traditional Africans acquire knowledge of the natural environment. It will argue that this inductive understanding of nature is a demonstration of the inductive inventiveness, skill and competence of traditional African people. But before this, there is the need to have a clear understanding of “what induction is”, to aid the reader with an understanding of the meaning of induction; as well as understand the old and current debates concerning African incapacity for induction and rationality.

The Nature of Induction

Induction is a process of logical reasoning by which knowledge of generalization or predictions is obtained from observational data (Gillies 1988: 179–203). In inductive generalization, there is a *leap* made from premises or evidence about particular cases to a conclusion that applies *generally*, beyond the specific instances. Inductive logic also makes predictions or projections from the present to the future. Whether by generalizations or predictions, inductive arguments enunciate and evince the claim that the chains of events so far observed will be resembled by the ones yet to be observed. From regular observations of a sequence of events, we are inclined to either hold that all cases or the next case will have a similar outcome or resemble the ones already observed. Hence, induction relies on probability to establish, authenticate and enunciate resemblances among observed and unobserved events.

In the view of Melanie Rosen, inductive justification of rational inference making, just like deduction has been of interest to many philosophers. According to her,

“... induction is a necessary part of human everyday reasoning [...]. Induction allows us to infer from a stock of knowledge of past observations and make a prediction of an occurrence in an unknown circumstance, either in the future or in an unobserved situation. From these predictions we also make generalisations or infer to laws of nature, stating that in all relevantly similar situations nature will be uniform.” (Rosen 2009: 155)

G. E. Allen and J. J. W. Baker argue that:

“A major pattern of thought involved in forming conceptualizations is known as induction [...]. Induction is the process of making general statements based upon a set of individual observations.” (Allen, Baker 2017: 44)

According to them:

“A generalization is a statement that is meant to apply to a large class of objects or set of phenomena. [...]. Generalizations are based on summarizing a number of specific observations of the same processes or object. Generalizations are highly useful because they point to a regularity among phenomena in the material world.” (Allen, Baker 2017: 39)

Hence, inductive argument is a fundamental tendency of human rational nature. It is a necessary and justifiable process of logical thinking in our daily activities. It affords a tentative justification of generalization. As S. H. Mellone rightly noted, inductive arguments “are of great importance in practical life” (Mellone 1934: 11). From a generalization inferred from

“... particular cases in view [...]. We pass to a general principle or law illustrated in them. [...] The tendency to inductive generalisation is fundamental, and is found in operation at all stages of mental life.” (Mellone 1934: 11–12)

Thus, inductive probing enlarges our scope of experiences; it enables us to reach a new stage. Although our questionings may not be seeking scientific explanations, they may enlarge acquaintance with our world and situations.

“The search is [...] for a larger fact.” (Mellone 1934: 191–192)

It is a desire to accumulate information about connected items and facts embedded in a series of events. Apart from making generalizations, induction also relies on data, observations and experimentations to arrive at a theory, particularly in the sciences.

For Francis Bacon, induction is the science of inquiring into nature; and this science begins with observation (Bacon 1965: 333). Hence, for him, all knowledge begins with sense experience. His notion of inductive science encourages a kind of unmindful exploitation of nature. According to him, humans must enter, search and penetrate the bowels, holes and corners of nature in pursuit of truth (see Bacon 1860: 343, 296, 506) and when they discover its causes and effect, then they should reproduce or modify its processes at will (Leiss 1972: 59; Bender 2003: 232–233). While this study concurs with the inductive means of understanding nature, it dissents from the recommendation of its brutish exploitation and instrumentalist conception presented by Bacon.

Inductive argument can neither be valid nor invalid like deductive argument. But it can be strong or weak, good or bad, better or worse, cogent or otherwise depending on the strength or degree of evidence, which the premises confer on the conclusion. Accordingly, the strength of inductive argument is measured with probability. Probability

“... is a quantitative measure of the evidential support that the premises give to the conclusion. It is a measure of how much we can rely on the conclusion of a particular inductive argument [...]” (Oke, Amodu 2006: 93)

Given the degree of evidential support, inductive conclusion may be highly probable, very reasonable to expect, plausible, presumable, apparent, almost certain, most likely, almost unreasonable to expect, and so on. Peter Flach correctly noted that inductive logic cannot be treated as a real-valued generalization of deductive validity. He argues that the only logical step in induction lies in hypothesis formation rather than evaluation. He maintains that there are two main forms of induction: explanatory induction and confirmatory induction. While explanatory induction induces a general theory that explains

given observations, confirmatory induction characterizes completely or partly observed models. So, logics of induction involve explanation-preserving reasoning and inference of confirmed hypotheses. These for him should be the starting points for further technical research (Flach 1997: 1, 25). According to him:

“Induction provides an idealized model for empirical sciences, where one aims to develop general theories that account for phenomena observed in controlled experiments. It also provides an idealized model for cognitive processes such as learning concepts from instances. The advent of the computer has suggested new inductive tasks such as program synthesis from examples of input-output behaviour and knowledge discovery in databases, and the application of inductive methods to Artificial Intelligence problems is an active research area, which has displayed considerable progress over the last decades.” (Flach 1997: 1)

There are various methods of induction.

Enumerative Induction: As a reasoning pattern, enumerative induction, also called inductive generalization, considers evidence from past similar situations to make a conclusion while relying on “large samples, random sampling and counterexamples” (Herrity: 2022). In enumerative induction, we extrapolate from the facts so far observed to a generalization about the whole class or other members of the class which we have not yet observed. In other words, we infer that the members of the class which we have not yet observed possess the same characteristics like the ones already observed. It forecasts from existing facts to the unknown or about the future, or events, which are yet to occur.

Analogy: Analogical induction draws resemblances between phenomena and concludes from these observed resemblances that the feature X which we observed in phenomenon A is also probably present in phenomenon B. For instance, if it is observed that A possessed d, e, f, g, and h, and B possessed d, e, f, and g, it can be probably inferred that B also possessed h. Structurally, analogical induction “proceeds from premises indicating the similarities of two or more things in one or more respects to the conclusion that the things are similar (probably) in some other respect” (Oke, Amodu 2006: 100). According to Irving Copi and Carl Cohen:

“Analogy is the most common ground of our everyday inferences from past experience to what the future will hold.” (Copi, Cohen 2005: 443)

Statistical Induction or Statistical Generalization: This is a type of inductive generalization. But it utilizes statistical data to draw conclusions. While it provides the context of an assumption, it remains “open to new evidence that might alter [its] theory” (Herrity: 2022). While enumerative induction concludes that all members of a class have a certain property based on the observation of only some members of the class, statistical induction, makes conclusions in percentage based only on members of the class so far observed. In other words, unlike enumerative induction, “statistical induction [...] rests its premise(s) on percentages of sample observations”. For instance:

“The likelihood [...] that the next X will have Y is 60%. [...] This statement statistically expresses the level of confidence that we can place on the hypothesis that the next X will have Y.” (Oke, Amodu 2006: 100)

Because statistical induction is based on percentage, a single counter instance cannot destroy its claim.

Casual Reasoning: This involves making a logical connection between a cause and a likely effect. For casual reasoning to be effective, there must be observable evidence; and the reasoning needs to establish “a strong relationship between the starting situation and the resulting inference” (Herrity 2022). This method, which seems to be central to other methods, was formulated by John Stuart Mill (1843). Causal reasoning has merit over simple enumeration, whose conclusions are characterised with contradictions. It also goes beyond mere analogy to establish relations between cause and effect, *vice versa*. When such relations are correctly established, the reasoning they inform is theoretically powerful and of greatest practical importance. According to Copi and Cohen,

“Our ability to control our environment, to live successfully and to achieve our purposes, depends critically upon our knowledge of causal connections.” (Copi, Cohen 2005: 469)

Induction is central in scientific reasoning. When a problem or some facts without any hitherto acceptable explanations have been identified, whether in medicine, natural sciences, environment, agriculture, and so on, the scientist attempts to look for probable reasons or causes as preliminary hypotheses. Thereafter, he gathers more facts about the phenomenon since the preliminary ones will be too negligible for a satisfactory explanation, and then, reformulate or refine his explanatory hypotheses depending on whether further findings corroborate or deviate from existing preliminary investigations. This will ultimately pass into theory (Copi, Cohen 2005: 525–530). According to Alexander Bird (1998: 10–11), knowledge in the natural sciences depends upon data gained by observation and experimentation. Just as the chemist conducts experiments in the course of an investigation, the meteorologist relies on data from a weather station and the geologist clambers up a rock face to observe an unusual rock stratum. The conclusion of the investigation of a scientist will become a theory, and the data he uses to justify the theory are the evidence. While ruminating over the value of induction to scientific inquiry, Bird argues that although induction does not guarantee logical certainty like deduction,

“But in saying something about the future, we will be adding to what we have already said about the past. That is what makes induction interesting and valuable. There would be no point in wanting induction to give us logical certainty, for this would be tantamount to wanting it to tell us nothing new about the future but only to restate what we already knew about the past.” (Bird 1998: 15)

Moses Oke and Akeem Amodu laud the practical utility of logic by making a distinction between logic as an art and logic as a science.

“... logic as a science is a dispassionate discipline. It strives for objectivity and is pursued for no self-centered practical interest. [...] as an art logic is pursued for the practical purpose of seeking self-improvement. In this case, we seek to learn the principles and procedures not simply for what they are, but also for how they may be efficiently employed to tackle real-life difficulties.” (Oke, Amodu 2006: 149–150)

They demonstrate how inductive reasoning is applicable in the humanities, citing legal reasoning as an instance. According to them, “judicial proof, as it is carried out in the courts, consists of logical processes that are mainly of the inductive, hypothetical and deductive methods”, and thus, “both deductive and inductive reasoning are needed to solve legal problems by way of setting up hypotheses which are either proved true or refuted”. A lawyer needs to know what evidence is rationally compelling to be able to successfully

defend his case or flaws his opponent's argument. This is important because, even when a defendant has an obviously good case, the plaintiff will destroy it if the defendant cannot rationally present it (Oke, Amodu 2006: 150–154). Both the defendants and the plaintiff employ various reasoning to convince the presiding judge about the merit of their case. Among others, they can employ analogical arguments and judicial precedents. When a claim has been instituted in court, any further evidence, that corroborates it strengthens it and increases the chance of the truthfulness of the claim. The ability of the presiding judge to pass good judgement “depends on the absence of extra-logical subjective considerations”, as well as his ability to distinguish good from bad reasoning. Just like the lawyers in arguments, he can pass judgement by employing analogical arguments and judicial precedents (Oke, Amodu 2006: 153–154, 157–158).

In social sciences, researchers rely mainly on statistical induction to reach conclusion. They observe specific behaviour, collect data, and established research findings and results to make a claim. Once a conclusion is reached, further observations or findings can weaken or strengthen it, depending on whether such findings corroborate the existing conclusion or not. So far, the challenges have been to establish the application of inductive reasoning in research, and to establish its importance in the search for truth or knowledge. The next task is to examine whether traditional African people employ inductive reasoning in their thought system.

Challenging the Idea of African Inductive Incapacity

Africans were at a time in the past erroneously regarded at best, as pre-logical by some thinkers such as W. H. Bentley (1900: 256), G. W. F. Hegel (1956: 93–99) and Lucien Levy-Bruhl (1978: 27–28). They argue that Africans lack a system of logic and a habit of constant reflection and rules they lived by because traditional cultures are deficient in abstract concepts and notions with which to formulate in universal terms those principles and terms which have become internalized (Sogolo 1993: 138). Specifically, W. H. Bentley argued that the African whether Negro or Bantu, does not think, reflect, or reason. Although they have a wonderful memory, great powers of observation and intuition, much freedom of speech, and very many good qualities, their reasoning and inventive faculties are dormant. Although they readily grasp the present circumstances, and functions accordingly, the capacity for a careful, thought-out plan or a clear piece of induction is beyond them (W. H. Bentley 1900: 256; Levy-Bruhl 1978: 27–28; Onyewuenyi 1994: 94).

With this same kind of temperament, Georg Wilhelm Friedrich Hegel argued that Africans are pre-human; they do not possess the natural principles of ideas which nature endowed humanity, that is, the category of universality. The consciousness of the Negro is incapable of realizing any substantive objective existence. Sorcery and magic are essential to their nature and are fundamental to their interpretation, actions, and ways of life (Hegel 1956: 93–99). Thus, Hegel denied Africans of rationality, civility, full consciousness, appreciation of human values, real humanity, correct thinking, and capacity for justice, morality, serenity and order. On his part, Lucien Levy-Bruhl argued that primitive societies are emotionally laden, non-rational and possess pre-logical mentality. According to him, primitive and pre-logical mind is not constrained to avoid contradiction. Logical exigencies are not always present

in its case. They sometimes admit of absurdity “without seeing any difficulty” (Levy-Bruhl 1978: 27–28; 1931: 17, 21, 31). Leopold Sedar Senghor concurs with Lucien Levy-Bruhl’s denial of rationality to Africans. He submits that Africans do not employ logic in their thought system when he opines that emotion is African as reason is Greek (Senghor 1964). In his opinion, the African is incapable of analytic distinctions. They cannot distinguish themselves from objects and social phenomena, nor can they make any distinction between subject and object of experience.

These kinds of denials were believed to be obsolete and overtaken by events as history unfolds. But very recently and in a different form, some scholars renewed their energy in this denunciation. For instance, Emmanuel Archibong and Usoro Usoro began this denigration by arguing that:

“Induction as a method of science is formulated from simple observation of particulars and their series, interconnectedness and order from whence general laws are derived.” (Archibong, Usoro 2014: 27)

According to them:

“The highpoint of induction is centered on ‘particular instantiation’ which informs the heart of the general conclusion.” (Archibong, Usoro 2014: 27)

These thinkers aver that this way of reasoning cannot be “replicated in African thought system especially when it is common knowledge that the particular ‘individual’ in African worldview is not seen nor heard but lost in the general scheme of things” (Archibong, Usoro 2014: 27). For this reason, they argue that the individual cannot be a basis for a general consensus about the truth of a matter (Archibong, Usoro 2014: 27). From their understanding of induction and the nature of the African, Africans, whether traditional or contemporary, are not capable of generalizations.

This submission does not correctly depict the African and their nature. Even if the individual were to be lost in the general scheme of things (which this study does not concur to), the African worldviews themselves are products of individual reflections in the first instance, later sanctioned and passed into community consensus or worldview or generalization for their pragmatic and utilitarian merits. For instance, the book *Axioms of Kemet. Instructions for Today from Ancient Egypt* contains wise sayings for daily guide in the process of life and living. These wise sayings are careful thoughts gathered over time, handed over to posterity for their guide regarding truth, morality, justice and so on. Specifically, the instructions of Amenemope, Merikare, Amenempe and Ptah-Hotep offer moral guidance to survive antiquity and were eventually passed from parents to children to facilitate peace and good governance. They inform our reality and consciousness since they constitute the foundation of our good values, respect, and key principles of human culture (Zulu 2006: 7, 9–34, 37–44). So, it is the modifications and accumulations of individual reflections, that constitute the belief and value systems of the traditional African people. Traditional Africans must have over time observed or suffered from a great deal of injustice, immorality, egoism, and other anti-human attitudes individually or collectively, and come to know that there are vices which impede peaceful coexistence and harmonious living. They must have also observed some instances of justice, moral living and altruism practiced at some other time, leading repeatedly to peaceful coexistence and harmonious organization of society; hence they are prescribed and handed down as values. Kwame Gyekye argues that African beliefs, practices, institutions,

myths, folktales and proverbs from which the cultural values of the African people are extracted constitute some of the features of communal structures of African society. They include religious values, humanity and brotherhood, communal and individualistic values, moral values, the family, economic values, political values and so on (Gyekye 1996: 1–121). Although these values may not be understood and practiced in the same way in all African cultures and societies, there could be “sufficient commonalities in many areas of the cultures of the African people” (Gyekye 1996: xiii–xiv). They must have over a time enhance the individual and community well-being. Hence they are handed down for posterity.

From the above renditions, it is obvious that Archibong and Usoro put forward misplaced and non-factual argumentations. The kind of argument they put forward (which we just interrogated), depicts a category mistake in the temperament of Gilbert Ryle. It inferred wrong conclusion from the premises presented. It brings together two things that are completely dissimilar; in other words, the premises and conclusion are completely disconnected. They inferred from the nature of induction (which either they do not completely understand or do not present all of its essential characteristics) to the conclusion that African people are deficient in inductive capacity because they are lost in the general scheme of things. Besides, they misconstrue the divergent use of particulars in different contexts. For instance, “particular(s)” as used in both inductive and deductive logic pertains to propositions; and in inductive logic specifically, it can also refer to concrete phenomena. But they diverge from these by situating its meaning to human beings or the particular “individual”, as they call it. This wrong foundation constitutes the premise of their arguments. This thus makes the cogency or validity of their engagement a nullity. Archibong and Usoro argue that induction is a creation of the west at least in principle and practice. In their view “when we attempt to place the principle of induction side by side with African thought system, it becomes like putting a square peg in a round hole” (Archibong, Usoro 2014: 29). They hold that it is communalism that characterizes Africans and their thought system because:

“The individual in Africa owes his existence to other people, including those of past generations and his contemporaries. [...] the individual depends on the corporate group [...]” (Archibong, Usoro 2014: 29)

This preceding view showcased by Archibong and Usoro is a mere projection of African beliefs or value systems. Even if the African is communalistic, *ceteris paribus*, communalism does not in any way suggest, or even imply a lack of inductive capacity. Besides, there can be no communal thinking without the individuals who do the thinking or think the thoughts.

Archibong and Usoro argue further that induction “as a western idea and culture runs antithetical to the spirit of brotherhood and kinship of the African” (Archibong, Usoro 2014: 29). According to them, this is predicated on this simple logic that

“... in western induction, the ‘general conclusion’ gets its identity from individual or particular instantiation; but in African thought system or logic, it is the ‘general’ that gives the ‘particular’ or an individual its identity; so that we can correctly say that the logic of western induction runs contrary to the logic of African thought system.” (Archibong, Usoro 2014: 29)

This position is also incorrect. Among others, there is evident wrong categorization by claiming that whereas induction is a western idea and culture, the

spirit of brotherhood and kinship are of the African culture, and both cultures run antithetical to each other. This intellectual and cultural exclusivist polarization is false and groundless. The spirit of brotherhood and kinship are not antithetical to induction or suggest incapacity for it, *vice versa*. Besides, their argument is tainted with mistaken identity, illogical analogy, or faulty comparison. First, the inference takes African value for African logic since the view they projected here is value-laden, but mistakenly taken for African logic. Not only this, even if Archibong and Usoro were to be correct in their argumentations, their parameter for differentiating Western from African logic shows that they do not have an in-depth understanding of the various processes of induction. Induction can proceed from particular to particular, particular to general and general to particular (Cederblom, Paulsen 1991: 217, 220–223). Thus, cogent inductive arguments do not consist only in the making of general conclusions based on specific or particular evidence. It can also proceed from particular to particular and from general to specific, but all with a probable conclusion (Aioboman 2016: 188). Another problem with this submission is that in differentiating western from African thought pattern, they claim that regarding the African, it is the “general” that gives the “particular” or an individual its identity. The response to this, just as noted not quite long, is that this “general” which now serves as a mirror for judging the individual was instantiated from particulars. This means the general is an initial product of induction unless it is construed in a purely abstract form in a deductive manner. It also implies that there can be no general without particulars with which it is composed. If Archibong and Usoro are taken for what they presented (but which we do not agree to), it is clear in their opinion that while induction and the capacity for its use are exclusive of western culture, deduction and the capacity for its use are exclusive of African culture. Following this culture exclusive categorization, that is, if induction and deduction are respectively and neatly allotted to western and African cultures, then what logic is there for the oriental culture, for instance? So, part of the argumentative position taken in this study is that no kind of logic is exclusive of any culture since all cultures are capable of any kind of logical reasoning. Archibong and Usoro also argue that induction as a western logic, embedded in her culture from whence science operates, does not fit into the African thought system. By this, they suggest that in addition to the lack of inductive capacity, African and perhaps other cultures also lack the capacity for science. This has the implications by extension that science is also exclusive of western people and culture. But as experience has shown, there is no known continent or race in the world whose people have not contributed to science. Thus, science or scientific reasoning, just like induction, is not exclusive to any culture. Archibong and Usoro claim that “every people and divide have their own unique and indigenous logic of viewing reality” (Archibong, Usoro 2014: 29). This claim seems not to be correct too. What is the African unique indigenous logic of viewing reality? They would offer inferences of particulars from general or maybe communalism. As evident from the above, this does not depict reality. In this argumentation, they ignore the universality of logic by alluding to unique cultural logic.

Almost the same time with Archibong and Usoro’s contention, Nkeonye Otakepov devotes his *Superstition. A Philosophical Analysis* to plummeting most traditional beliefs and practices whether in Africa or elsewhere to superstitions rather than inferences from rational procedure. In projecting his

views, Otakpor makes a maximum appeal to David Hume's rejection of causality for non-empirical content; he takes this as the arbiter for rationality and logicity (Otakpor 2016: 10–23). Some of the beliefs which he consigned to superstitions include:

1. breaking of a mirror is a signification of bad luck;
2. the hitting of one's left foot on a stone is a signification of an impending event;
3. the persistent itching of the palm is a signification that one is about to receive a gift, particularly money;
4. the itching of the eyes is a signification that one's parents are going to give the child a gift;
5. when a lizard runs across a young girl's legs, it is a signification that she will get pregnant or that she is pregnant;
6. sexual intercourse in the daytime result in the birth of albinos and physically deformed babies;
7. sexual intercourse in the farmland in the daytime cause the infertility of the soil and thus famine, hunger and disease;
8. adultery on the part of a woman will cause sickness or death of children and men;
9. the presence of an owl in the night is the cause of the death of the sick child in the morning (Otakpor 2016: 15–16).

Otakpor (2016: 6–8, 10, 14–17, 19–21) argues that superstitious belief is universal; it is one of the many things human beings have in common, despite their ethnic, religious political and cultural enclaves or proclivities, and it is an important ideational element in any culture. He maintains that superstitious beliefs run through many different peoples, cultures and environment, whether the primitive people from Africa to Asia or among the modern people in North and Latin America, Europe and Australia. Citing an instance amongst others, he noted that the European belief in witches and witchcrafts is as superstitious as African, Arab, American, Indian, and Chinese. Regarding the genesis of superstitions, Otakpor contends that people event magic, religion and superstition to account for unknown causes or the events or phenomena they could not understand. But the question now is: at what point did the different cultures and races converge to invent and endorse superstitions to account for what they could not explain or understand? Or do different cultures converge independently, simultaneously or spontaneously with or without the foreknowledge of others to invent these superstitions? What is it about these beliefs that traditional people could not understand or offer rational explanations and then event superstition to account for them? Any claim to convergence for the invention of superstitions is ahistorical. Besides, by what means does the traditional man derive his empirical beliefs and practices concerning agriculture, animal husbandry, food processing, herbal remedy, and so on? Is it also by superstition? All their beliefs – whether empirical or non-empirical – must have resulted from the same processes of rationality and induction. As simplistic as they may seem, these conclusions, claims or generalizations could result from careful observations, constant conjunctions or correlation of many instances of the phenomena in question without exception over time. Although they may all not pass the test of causal explanation, they may pass the test of reason-giving explanations. If they or some of them are found to be false or contrary to experience with further investigation or evidence as time

unfolds, this would not mean they were superstitions because such occurrence is inherent in induction. Even scientific theories and conclusions suffer from these same inductive infelicities.

In evaluating superstition with the canon of empirical science, Otakpor (2016: ix, 1–6, 39, 44) sees most traditional beliefs as products of human abandonment of reason, ignorance, irrationalism, unreason, supernatural extravagance, and abandonment of inconvenient truth for convenient falsehood. For him, science seems to be the sole panacea for rationality. Thus, Otakpor debunks what he considered to be superstitions as rational enterprises and as having rational foundations. But an in-depth reflection would reveal that most of the beliefs which Otakpor identified and labelled superstitions are products of inductive inferences. He labels these beliefs superstitions not only because in his thinking they are not rational but also because they are probably not inferential. But the examples, which he gave of these superstitions, are actually, inferences that result from inductive premises. The careful observation of such premises and their results, the regularities of such occurrences and the constant conjunctions of the phenomena in question, justify and establish such conclusions rationally. Thus, most of what Otakpor labels superstitions and irrational are products of inductive inferences. Therefore, the reasons that inform their rejections are based on wrong epistemic premises and his submission is thus based on inferential error.

While Archibong and Usoro were arguing for African incapacity for induction, and while Otakpor was consigning traditional beliefs and practices to superstitions, Felix Airoboman was almost at the same time arguing for African capacity for induction and rationality. Airoboman argues that African beliefs and practices which are relegated to irrationality, illogicality or at best pre-logicality are products of the inductive inference, inventiveness and rationality of our forefathers, and they are their legacies. He establishes his claim by showcasing some of these beliefs and concrete practices in traditional African culture that proceed from, and are achieved with the inductive method. He extends his argument by demonstrating that induction from the African standpoint transcends empirical observations to ontological explanations of realities (Airoboman 2016: 186–200). Thus, Airoboman would conceive it lamentable that some African scholars have hastily in recent time joined in the intellectual debasement of consigning African or other traditional beliefs to superstitions, whereas, they are the inductive feats of their progenitors.

Apart from Airoboman, some other scholars do not also concur with these debasements. For instance, Abdul Ghaniyi Bello argues that “rationality is at the centre of our claim to humanity”. He quoted Godwin Sogolo who maintains that “to be human [...] is to be rational, that is, to possess the ability for creative and reflective thinking” (Sogolo 1993: xii). These suggest that rationality is a prelude to being human. Bello, therefore, wonders why some scholars of anthropology and philosophy classify Africans as pre-logical and pre-rational or non-rational. He wondered why any scholar would hold such views “about any people who have a system of names and nomenclature, who practised agriculture and medicine, domesticated animals, and conducted warfare”. For Bello, all these activities involve some rational procedure, no matter how rudimentary. Bello thus maintains that African beliefs are rational and it would be wrong for anyone to claim that “ancient” Africans are pre-logical or that their beliefs were non-rational (Bello 2016: 74–76). From this argument, it is apparent that Bello would also imbue on any traditional

cultures these qualities of rationality and logicity that are denied them by some scholars.

It seems evident from the preceding arguments that most African traditional practices result from their beliefs. These beliefs and their resultant practices are inductively derived, and they constitute African values. Even the African beliefs, values and practices which are often consigned to myth or superstitions are rationally derived, and they are instruments to control behaviour, that is, to enforce and secure compliance. In what follows, an attempt will be made to expound how the traditional Africans understand, acquire and establish knowledge of nature inductively in their cultural milieu, and how this knowledge informs and influence their concrete practices and behaviours. Here, analyses will centre on agriculture, animal husbandry, medicine, gynaecology, orthopaedics, science and technology, time and season, among others, to indicate how the knowledge of nature results from inductive processes. Although there are other ways the traditional Africans understand or relate with nature, the aim here is to argue that there are inductive trends of thought in the African understanding of the natural environment. If we can demonstrate that induction is a way of understanding nature in Africa, then, we would have concurrently established the fact that this type of logic is a feature of the African thought pattern.

Inductive Understanding of the Natural Environment in African Thought

The traditional African way of understanding nature is replete with induction. This kind of inductive understanding comes with the personal encounter of the inquirer (that is, the potential knower) with the object of inquiry (that is, the object to be known). The ensuing knowledge is established with several, coherent, consistent pattern of occurrences yielding similar results. This phenomenologico-scientific pattern of experiential contact with reality may be different from the modern kind of experimental investigation carried out with scientific instruments, and which may do without any comprehensive encounter with the reality in question. We shall begin this pending survey with agriculture.

Agriculture: Most African communities are agrarian. In the modern sense, while science conducts tests to determine the fertility of a soil and the type of crop it is best suited, the traditional Africans determine this by experiential contact with nature. If a particular soil yields bad crops on repeated cultivation, it is inferred that such soil best suits other crops. If other varieties of crops equally yield poorly in the same soil, it is inferred that such soil is infertile. Then, it is abandoned for better ones (Airoboman 2016: 191). Besides, through inductive investigation, the Africans come to understand the agricultural practices of bush fallow, mixed cropping, crop rotation and shifting cultivation. When crops cease to yield good and bountiful produce on repeated cultivation in the same piece of land, such a *hitherto* known fertile soil is used for other crops or left unused for some time. If it yields good produce when used again, and when this is observed repeatedly, the Africans then understand that leaving a piece of land for some time to fallow allows it to regain its fertility and thus understand the agricultural practices of shifting cultivation, bush fallow and rudimentary crop rotation. Although traditional Africans may not have invented these concepts, nevertheless, they understood the processes

and practices. The traditional African knowledge of mixed cropping is also inductively established. This agricultural system involves the cultivation of different crops in the same piece of land. But the practice ensures for instance that different deep-rooted crops are not planted at the same time or in the same season; rather, a deep-rooted crop is planted simultaneously with a shallow-rooted crop. This is to ensure that the various crops do not compete for the same soil nutrients. In this practice, some crops such as legumes provide cover for the topsoil and thereby help in controlling erosion, increase the actions of nitrogen-fixing bacteria, and thus increase the quantity of nitrogen in the soil. The African employs this agricultural method of mixed cropping and prefers it to monoculture to enable them to meet his food needs and at the same time maintain labour economy. This only becomes an acceptable and established method of farming through repeated observation over time.

Through repeated experimentations and the consequent proliferation of similar results, the traditional Africans also come to understand and established the desired method of raising different domestic animals and tending different crops for maximum productivity. In the same way, traditional Africans discover different remedies for different challenges that can impede the maximum productivity of their crops and animals. They discover and then know the type and parts of different plants whose contents can be harnessed or synthesized to treat and repel weevils, lice, fungal and bacterial diseases and many other challenges that can hamper their domestication and other agricultural engagements. The traditional Africans were able to harness and establish these desired methods as their inductive findings; and these findings are their unflinching, indissoluble legacies and our perpetual heritage. This African inductive acumen is also glaring in traditional African medicine.

Medicine: Traditional medicine as practiced in Africa is about “curing man’s disharmony with himself, another person, nature and environment” (Tunde, Nanpan 2019: 71). According to Ubrurhe, there are “three types of diseases in West Africa, namely, natural, supernatural, and spiritual diseases” (Ubrurhe 2003; Tunde, Nanpan 2019: 72). African traditional medicine consists of the “knowledge and practice which is used in diagnosis, prevention and elimination of physical, mental and spiritual or social problems” (Alem 2019: 17). Such knowledge and practices, explicable or inexplicable, relied exclusively on past experiences and observations handed down from generation (Sofowora 1984: 21; Tunde, Nanpan 2019: 17). George Way Harley (1970: 20–74, 98–122) made a detailed presentation of the kinds, purpose and functions of native medicine in Africa with a special focus on the Mano ethnic group in Liberia. The practice of native medicine among the Mano ranges from treatment of epidemic, infection, nervous, circulatory, digestive, genitourinary, ear, throat, nose, orthopaedic, respiratory, teeth, neurological diseases to the management of pregnancy, trauma, infancy diseases, surgery and preventive medicine, among others. African trado-medical practice involves among others, the use of traditional herbal medicines, derived from plants to treat diseases. The ancient Egyptians developed the tradition of herbal remedy and the methods of clinical therapy. They were also well developed in gynaecology and surgery for both ornamental and medical purposes such as bone setting (Alem 2019: 18). Many other traditional African societies such as Nigeria and South Africa also had healers who are competent in medical experience. They “performed a variety of functions for African communities” including “using herbs and surgical procedures to cure and mend the body”

(Flint 2008: 2), as well as using other means to cure or normalize social, spiritual and psychosomatic discomforts. Thus, for the traditional African, to be healthy involves the combination of physical, spiritual, social, moral and psychological wellbeing of the person.

Regarding the ingredients used in African traditional medicine, the traditional healer makes his herbal medicaments from parts of some plants such as “leaves, roots, barks [...] seeds, flowers, juices”, as well as part of some “animals, rocks and mystical substances for the prevention and cure of animals” and “the treatment of biological diseases” (Tunde, Nanpan 2019: 71).

“Social, psychological and psychosomatic ailments are treated with ritual medicine. Some of the ritual objects often used are goats, cows, sheep, snakes, bones, oil, rocks, eggs and a host of other items.” (Tunde, Nanpan 2019: 72)

These material and ontological aspects of medicine are products of observations, experimentations and experiences acquired over time which have been in use for centuries, if not millennia. If they have not been working, Africans and their predecessors would have disengaged from their use all these while; and it would have been abysmal to continue their use and bequeath such knowledge on their progeny. Where these continue to yield results on regular basis, they become internalized, prescribed and perpetuated. These are parts of the existential realities of African people, by which they inductively discover through research, curative remedy.

How does the traditional African discover or know the beneficial and harmful parts of medicine and how to or not to use them? African method of knowing and establishing the use or otherwise of curative and poisonous medicines is inductive. In African trado-medical practice, when a particular herb has a palliative or curative effect on repeated use on a particular illness or bites, it is inferred that such herb is medicinal or curative. If the repeated use of a particular herb is always associated with death or other harmful effects, then it is inferred that such herb is poisonous. It is by the same method the Africans discovered local herbs and other means which are often very efficacious in preventing diseases, dis-eases (or discomforts) and bites. By these observations, predictions are made that the consequences of the use of these curative, preventive and poisonous herbs will extend into the future. The Africans, therefore, discontinue the use of the poisonous ones while they continue to develop and use the curative and preventive ones and teach them to their children (Airoboman 2016: 191–192). It is also with this inductive investigation that they come to know the combination of different parts of nature or kinds of herbs that can produce curative and other desired results for biological diseases and other discomforts. In this way, they discover medications that can either ameliorate, enhance, prevent, treat or cure malaria fever, diabetes, hypertension, snake bites, scorpion bites, epilepsy, hernia, bleeding, coma, headaches, glaucoma, cataract, stomach ache, asthma, stroke, typhoid fever, cholera, arthritis, pneumonia, diarrhoea, dysentery, heart and breathing defects, sexually transmitted diseases, impotency, infertility, abortion, protracted labour, protracted pregnancy, menstrual defects, toothache, weak erection, acne, whitlow, cough, eczema, sore, ulcer, indigestion, loss of appetite, and other dis-eases, that afflict humankind, as well as those for domestic animals, including analgesics.

The African inductive capacity is also replete in her trado-medical practice of bone setting. In many African countries, towns and villages, there are traditional bone-setters, otherwise known as traditional orthopaedics.

Mume (2000:10) maintains that:

“Among the Uzo (ijaw) who probably originated bone-setting treatment in Nigeria, the leg of a chicken is fractured and treated at the same time as treating a human fracture. It is believed that when the chicken is able to walk again, the patient’s fracture will have healed sufficiently for him to try walking with the bad leg.” (Tunde, Nanpan 2019: 73)

As experience has shown, “some bone-setters may treat severe cases that hospitals may find difficult to treat” (Tunde, Nanpan 2019: 73).

Hence some patients are often referred to traditional orthopaedics from orthodox hospitals. Such referrals lay credence to the claim that the efficacy of traditional orthopaedics outweighs the orthodox ones.

The traditional orthopaedic method described above is also prominent among some Esan communities in Edo State, Nigeria. For example, the people of Ogwa are remarkable for this practice. But the practice of fracturing the part of the chicken similar to the fractured body part of the human patient may raise a serious issue in environmental ethics. Sentientists and those who argue that the whole of nature or species and their parts have inherent worth will condemn such act. They will see the traditional bone-setter using the chicken as a means to an end, that is, the end of detecting the healing process or barometer of the sick human patient. Since the chicken satisfies the criteria for moral standing by sentientists, biocentrists ecocentrists and holists, they will not accept or approve the practice. However, these various practices are products of inductive experimentations that have proved efficacious among the practitioners (healers), the patients and the generality of people in such communities. This argument can be extended to gynaecology, another branch of medicine in modern thought.

Obstetrics and gynaecology: According to Felix Airoboman (2016: 192), the African inductive ingenuity is also highly demonstrated by traditional birth attendants. Over time, and on regular observations, the traditional African birth attendants discover medicaments and acquire knowledge and skills that enable them to attend to women during infertility, pregnancies, childbirths, lactations and post-delivery periods. Because they have witnessed repeated deliveries, they are able to render services and proffer solutions to complications associated with pre-conception, conception and post-conception. For instance, they offer a wealth of practical guidance on many issues and provide herbal and other remedies that maintain birth control, (that is, prevent or induce conceptions and abortions), induce labour, reduce overweight babies, hasten protracted labours, reduce labour pains, inhibit chances of miscarriages and reposition improperly positioned babies in the womb. In the same manner, they cure infections associated with pre-pregnancies, pregnancies, deliveries and post-pregnancies, including cases of induced and spontaneous abortions. These feats, which they acquired over time through inductive interaction with, and investigation of nature have been workable for traditional people and are still in successful use by some people and in some places till date. These gynaecological and obstetrical faculties and methodic practices are not limited to Africa. Other traditional people such as those in Europe and America also had this inductive capacity, and practice it till the early 20th century. Vrinda Dalmiya and Linda Alcoff quote English maintaining that “many of these herbal concoctions are still used today in modern pharmacology” (Dalmiya, Alcoff 1993: 222). This points to the claim that traditional people everywhere are capable of inductive exploit.

Animal husbandry: The African inductive investigation and the consequent knowledge of nature can also be ably demonstrated with animal husbandry. In animal husbandry (Aioboman 2016: 193), for example, by repeated episodes of snakebites and the consequent death of victims of such bites, the African infers that snakes are poisonous and their bites are deadly. By repeated attacks, it is concluded that some animals are wild and dangerous. And by repeated observations of friendliness and harmlessness, it is known by inference that some specific animals can be domesticated. This is how the African come to domesticate some animals, dread some, and remain indifferent about others. The extent of the African care and friendliness with animals depends on how innocuous, useful or potentially useful they are to him or her and their communities. This knowledge does not result from foreign culture but from the traditional African inductive initiative.

Technology: Before the colonial era, Africa was rich in natural resources. To make these resources available to their needs, Africans devised over time some methods of transforming them into usable or preserve-able forms through experimentations. Joseph Osagie and Leo Otoide argue with specific reference to the Esan people of South-South Nigeria that there were cottage industries for palm oil, wood and timber, cloth and mat weaving, blacksmithing, gin production, food processing and preservation, pottery, palm wine production, soap making, rubber processing, among others (Osagie, Otoide 2015: 73–74, 76–92). According to them,

“From early times, Esan displayed a very dynamic response and initiative in harnessing the various natural resources in their environment. [...] Esan devised methods and techniques for making various articles or products which they needed from local resources. The process of production, even though was basically manual, was able to turn out manufactured goods for local consumption as well as exchange for goods which they needed [...] There emerged in this manner some kind of household manufacturing engagements which were carried out either on part-time or full-time basis. These household engagements gave rise to the various cottage industries that thrived in Esan. Although the processes of manufacturing were crude and time consuming, the indigenous people were able to meet practically all their basic needs. They not only produced for consumption but had enough to sell or exchange for other items they needed.” (Osagie, Otoide 2015: 74)

These were all possible because of their observation and experimentation with the phenomena in question, such as agricultural produce, handiwork, products of cottage industries and produced tools. Since there were no existing blueprints, they were only able to achieve these technological feats in different areas through inductive exploits. This is not limited to Esan because many other African societies also displayed these capacities and initiatives.

After series of experimentations, and after repeated episodes of successes, the Africans established, for example, methods of processing and preserving food (such as *fufu*, garri, rice, groundnuts, melon, yam, pounded yam, and so on), methods of producing tools and firearms (such as knife, cutlass, hoe, bows and arrows, gun, spear, and so on), methods of making clothing and shelter, brewing gin, among others (Nwaubani 1989: 3). Taking melon for instance, after maturity, the African gathers the pods and cuts their tips to allow them to soften for about five days. Thereafter, he washed them clean and dry with the sun for about four days. When properly dried, they are stored in containers for preservation and used till the next season, which is usually a year. Preparing melon soup also involves a process. The melon is broken to remove the shaft until the required quantity is obtained. It is fried and pounded to specification with other condiments such as onions and pepper, and then cooked with

other necessary and sizeable ingredients to make a pot of melon soup. Taking *fufu* processing and preservation as another example, when planted cassava matures, it is harvested by piecemeal. The harvested ones are peeled, washed, cut into sizeable pieces, soak in water and allowed for about four days to ferment. Thereafter, it is washed sternly to ensure it does not smell, then filtered and drilled to achieve solidity. Then it is parboiled and wrapped into size for short-term preservation. It is boiled again and pounded with mortar and pestle, and consumed with available soup. Unless it undergoes this process, its consumption may be harmful. These technological accomplishments, though rudimentary, result from inductive enquiry emanating from the desire to preserve some products of nature, or convert them into usable forms, which ordinarily have very limited life span in their raw form, or cannot be used in that form to meet intended ends. They become established through repeated positive results of inductive surveys.

Time: Some African traditional means of measuring or gauging *time* over time are shadow and the sun. This is based on the repeated episodes of observations of the nature of shadow cast and the direction of the sun. By the length of the shadow and its direction, the African knows the time of the day. When the shadow reaches a point, or eventually disappears, people would know whether it is morning, noon, mid-day, evening, night or any interval between them. With the direction or position of the sun, the traditional African could also determine the time of the day just as he could determine the time and weather of the day with the degree of intensity of the sun. With the appearance, disappearance and reappearance of the celestial bodies, such as the sun, moon and star, and with the degree and nature of brightness, dullness or otherwise of a particular moment, the African would also know whether it is morning, midday, evening, night or any other time of the day. In these ways, he understands and measures time. Cock crows are also used to gauge time such as approaching daybreak, early morning and midday. The moon was used as a means of lunar calendar after a repeated and consistent pattern of observations without deviation. These time measures were established through inductive insight, intelligence and originality of traditional African people.

Season: With the appearances, disappearances and reappearances of some celestial bodies, with the particular period and mode of these appearances or disappearances and the rate of frequency over a time, the Africans measure the various seasons of the year. Even before the invention of the Gregorian calendar, the African understands the various seasons and prepares for such seasons as necessary. They know the approaching of the rainy and dry seasons, and of planting and harvesting seasons, and prepare for them accordingly. The appearances and shedding of leaves, as well as fruiting by some plants, are indications of a specific season or the approaching of a certain period or season of the year. Rainfall and harmattan also indicate specific seasons of the year. Along with these patterns of seasons, the Africans organized their economic and socio-cultural activities, including their various festivals. The knowledge of these phenomena is established based on regularities, priorities in time and constant conjunctions. Since they have watched the regularities and constancies of these events, they make predictions about them and project them into the future.

From the presentations so far it is evident that inductive exploit has practical impacts on the daily living of the African people. In other words, the African pattern of knowledge of nature is pragmatic in that they adopt them because

they work for them; and they are effective in guiding their lives and in resolving their problems. In addition to the views presented so far, induction in African thought and practice transcends empirical experience or observation of nature to assume some ontological dimensions.

Ontologico-Inductive Dimension of Understanding Nature in African Thought: Some ontological beliefs about nature are inductively and rationally derived. Africans know some parts of nature that are charged with force, that possessed independent energy and that can be harnessed and used to achieve desired results. For instance, they know the kinds of plants and animals or their parts that are acceptable to, and thus can be used to appease, immolate or thank divinities and ancestors. They also know the type and parts of plants that can arrest thunder and thus cultivate them round their homes. They know the type and parts of plants that can repel witches, wizards and evil spirits and use them as desired. In the same way, they know that *ukhinmin* tree (*neubodia laevis*) seals human pacts with ancestors. Although these may be consigned to myth or superstition by some scholars, the traditional African society establishes these claims inductively by regular observation of particular instances and the successive correlations between events, actions and results. This is why it is correct to say that inductive reasoning is reflected in African ontological beliefs, whether in traditional or modern African societies. By repeated antecedents and consequents of events of nature, causal connections are established between them. Although the veracity of this causal relatedness can be queried by modern science, for traditional Africans, the relatedness is strong, necessary and well established in organizing their daily lives. These show that induction in African understanding does not only consist in a sustained empirical observations and investigations of nature, it also consists in the ontological ascription of causal explanations to the phenomena in question. For instance, even in the treatment of empirical diseases such as bone-sets that is physical, psychological and psychosomatic illnesses, among others, there is the employment of ontological measures to ensure efficacy. This may help to explain the deliberate fracture of the part of a cock, corresponding to the fractured part of the human body, employed by traditional orthopaedics as part of the procedure in treating their patients. In fact, there have been observed similarities in the healing process, for instance, of the fractured leg of the human individual and the leg of the cock broken by the traditional orthopaedic healer; and this authenticates ontological causal connections between them, which seems visible in the empirical.

Granted that the focus of this study is on inductive logic, this does not suggest that traditional Africans lack the capacity for understanding or interpreting nature deductively. The inductive conclusions that are made constitute deductive premises, and sometimes value systems, upon which further interpretations and inferences are based and upon which the daily lives and activities of the people are guided, interpreted and judged. And when errors are detected, such conclusions are revised. An inductive argument does not need to be true to ascertain a claim just as a deductive argument does not need to be sound to establish its validity. However, such an inductive argument needs to be cogent or strong or reasonable to authenticate its claims to eliminate or minimize errors. As noted already by Alexander Bird, (1998: 15), it would be pointless to want induction to give us logical certainty like deduction; because this would be tantamount to wanting it to tell us nothing new about the future but only to restate what we already knew about the past. Zoe Kaplan (2022) correctly

noted that in inductive reasoning we use predictive thinking by combining observation with experience to reach a conclusion. Although such a conclusion reached is not certain, at least, it is a probable, educated, and informed guess based on our observation. It is helpful because it enables us to arrive at potential and probable solutions.

Conclusion

Although almost all that humans need are available in nature, nature neither put the majority of these resources into usable forms nor did it teach humans how to use or transform them. Humans were only able to discover them, their uses and potencies either through trial and error or chance occurrence and eventually established them through inductive experimentations as they repeatedly yield identical results. Some others were established through direct inductive investigations or experimentations with nature. The position here is that induction, rather than myth or superstition, serves as the best explanation to the emergence of traditional beliefs and practices of traditional people.

Consequent upon this submission, this study analysed the African inductive investigation of nature to expound how the African gains knowledge of the environment. The study argues that induction suffuses the traditional African way of knowing reality, including the natural environment. It debunked the claims made by some scholars that induction is not a part of the African thinking pattern, that induction is exclusive of westerners and that most traditional beliefs are superstitions, irrational and non-inferential. While presenting how nature is understood through inductive reasoning from the traditional African perspective, the study points to the fact that the traditional African mode of inductive understanding of nature is not abstract. It has to do with the personal encounter of the potential knower or possessor of the relevant knowledge of nature with the object to be known (but without claiming in any way that Africans – whether traditional or contemporary – are not capable of abstractions or abstract reasoning). Most of the knowledge and belief systems, which the Africans have regarding the natural environment and the practices which result from them are the outcome of inductive inferences and practices accumulated over time. They are the result of careful observations, reasoning, and reflections by their ancestors, which are transmitted for posterity as their legacies; they are rationally supported since they emanate from rational procedures. This experiential and inferential way of reasoning and arriving at knowledge in Africa is an acceptable one. This is because induction is an acceptable method of logical and scientific reasoning, including our engagements in the ordinary business of life. From this study, it is evident that the African is both empirically and ontologically ingrained in induction.

These claims made about how the African knowledge of nature is inductively derived have been a reasoning pattern by Africans. The practices which result from this reasoning were predominant in their everyday life before contact with other cultures of the world. If any of the beliefs or practices is later found to be counterfactual, it would not be because it is a myth or superstition, but because such occurrence is fundamental to the nature of induction. Since inductive conclusions are not unassailable, but only probable, further investigation can reveal contrary evidence. The pattern of induction is to extrapolate from and beyond existing data, and we rely on the conclusion therefrom in daily engagements. Since the beliefs and practices, which result from the

African inductive investigations are reliable in guiding their daily activities and solving their problems, it follows that induction is a veritable reasoning pattern in African understanding of reality, including their understanding of the natural environment. It is a mode of knowledge acquisition that guides their constitutive activities. This implies that the African has a pattern that can be relied upon and that fits properly into the global scene. It would therefore be improper to deny the African of rationality, inductive capacity and proficiency or consign their intellectual heritage, beliefs and practices to superstitions.

In summary, this study examined how traditional African people understand nature inductively and argued that most traditional beliefs and the concrete acts they impose ensued from inductive and rational procedures. Since it has been established that the traditional Africans can understand nature inductively, and demonstrated how this knowledge is derived, it is therefore proper to claim that Africans are capable of inductive logic, inference, and rationality.

Bibliography

Airoboman, Felix (2016): “Inductive Procedure in African Thought”, *Humanity: Journal of General Studies* 8 (2016) 1, pp. 186–200.

Alem, Aderajew (2019): “African systems of thought: Whether they fit scientific knowledge”, *Journal of Philosophy and Culture* 7 (2019) 2, pp. 14–25, doi: <https://doi.org/10.5897/JPC2018.0024>.

Allen, Garland E.; Baker, Jeffrey J. W. (2017): “The Nature and Logic of Science”, in: Garland E. Allen; Jeffrey J. W. Baker, *Scientific Process and Social Issues in Biology Education*, Springer International Publishing, Switzerland, pp. 29–82.

Archibong, Emmanuel Iniobong; Usoro, Usoro I. (2014): “A Critical Examination of Induction and African thought System”, *Global Journal of Human-Social Science: Arts & Humanities. Psychology* 14 (2014) 7, pp. 27–30.

Bacon, Francis (1860): *The Works of Francis Bacon*, Vols. 4–5, Spedding, Ellis and Heath, London.

Bacon, Francis (1965): “The New Organon”, in: Warhaft Sidney (ed.), *Francis Bacon. A Selection of His Works*, Macmillan, Toronto, pp. 325–392.

Bello, Abdul Ghaniyi (2016): “Logic, Rationality and Morality”, in: Oyeshile Olatunji; Francis Offor (eds.), *Ethics, Governance and Social Order in Africa: Essays in Honour of Godwin S. Sogolo*, Zenith Publishing House Ltd., Ibadan, pp. 71–79.

Bender, Frederic (2003): *The Culture of Extinction: Toward a Philosophy of Deep Ecology*, Humanity Books, New York.

Bentley, William Holman (1900): *Pioneering on the Congo*, Fleming H. Revell Co., New York.

Bird, Alexander (1998): *Philosophy of Science*, UCL Press Limited, London.

Cederblom, Jerry; Paulsen, David (1991) *Critical Thinking: Understanding and Criticizing Arguments and Theories*, 3rd ed., Wadsworth Publishing Company, Belmont.

Copi, Irving M.; Cohen, Carl (2005): *Introduction to Logic*, 12th ed., Pearson Education, Inc., New Jersey.

Dalmiya, Vrinda; Alcoff, Linda (1993): “Are ‘Old Wives’ Tales’ Justified?”, in: Linda Alcoff, Elizabeth Potter (eds.), *Feminist Epistemologies*, Routledge, New York, pp. 217–244.

Flach, Peter (1997): “On the Logic of Induction”, *Philosophy of Science* 64 (1997) 2, pp. 1–29. Available at: <https://www.researchgate.net/publication/228574002> (accessed on 3 February 2023).

Flint, Karen Elizabeth (2008): *Healing Traditions. African Medicine, Cultural Exchange, and Competition in South Africa, 1820–1948*, Ohio University Press, Athens.

Gillies, Donald (1988): “Induction and Probability”, in: G. H. R. Parkinson (ed.), *An Encyclopedia of Philosophy*, Routledge, London, pp. 179–203.

Gyekye, Kwame (1996): *African Cultural Values: An introduction*, Sankofa Publishing Company, Accra.

Harley, George Way (1970): *Native African Medicine*, Frank Cass and Co. Ltd., London.

Hegel, Georg Wilhelm Friedrich (1956): *The Philosophy of History*, transl. John Sibree, Dover Publications, Inc., New York.

Herrity, Jennifer (2022): “What Is Inductive Reasoning? Definitions, Types and Examples”, *Indeed*. Available at: <https://www.indeed.com/career-advice/career-development/inductive-reasoning> (accessed on 3 February 2023).

Kaplan, Zoe (2022): “What Is Inductive Reasoning?”, *Forge*. Available at: <https://www.theforge.com/blog/skills/inductive-reasoning> (accessed 3 February 2023).

Leiss, William (1972): *The Domination of Nature*, Beacon, Boston.

Lévy-Bruhl, Lucien (1931): *La Mentalité Primitive*, Clarendon Press, Oxford.

Lévy-Bruhl, Lucien (1978): *Primitive Mentality*, AM Press, Inc., New York.

Mathews, Freya (2014): “Environmental Philosophy”, in: Graham Oppy, N. N. Trakakis (eds.), *History of Philosophy in Australia and New Zealand*, Springer, Dordrecht, pp. 543–591.

Mellone, Sydney Herbert (1934): *Elements of Modern Logic*, University Tutorial Press Ltd., London.

Nwaubani, Ebere (1989): “Searching for Relevance in History”, *Nsukka Journal of History* 1 (1989) 1, pp. 1–15.

Oke, Moses; Amodu, Akeem (2006): *Argument and Evidence: An Introduction to Critical Thinking*, Hope Publication, Ibadan.

Onyewuenyi, Innocent (1994): *The African Origin of Greek Philosophy: An Exercise in Afrocentrism*, University of Nigeria Press, Nsukka.

Osagie, Joseph Inegbenedho; Otoide, Leo Enahoro (2015): “Colonial Rule and Industrialization in Esan, Benin Province, Nigeria: A Case Study of Institutional Adaptation”, *African Research Review: An International Multidisciplinary Journal* 9 (2015) 1, pp. 73–94, doi: <http://dx.doi.org/10.4314/afirrev.v9i1.7>.

Otakpor, Nkeonye (2016): *Superstition: A Philosophical Analysis*, Mindex Publishing Company Limited, Benin City.

Rosen, Melanie (2009): “A Pragmatic Justification of Deduction”, *Kritike* 3 (2010) 1, pp. 155–167.

Senghor, Leopold Sedar (1964): *On African Socialism*, transl. Mercer Cook, Paul Mall Press, London.

Sofowora, Abayomi (1984): *Medicinal Plants and Traditional Medicine in Africa*, Spectrum Books Limited, Ibadan.

Sogolo, Godwin (1993): *Foundations of African Philosophy: A Definitive Analysis of Conceptual Issues in African Thought*, Ibadan, Ibadan University Press.

Tunde, Osawu; Nanpan, Kangpe Nakam (2019): “African Traditional Medicine and Orthodox Medicine: The Missing Link”, *Albertine Journal of Philosophy & Related Disciplines* 3 (2019) 1, pp. 70–77.

Ubrurhe, John Oroshejede (2003): *Urhobo Traditional Medicine*, Spectrum Books Limited, Ibadan.

Zulu, Itibari M. (2006): *Axioms of Kemet: Instructions for Today from Ancient Egypt*, Amen-Ra Theological Seminary Press, Los Angeles.

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u tradicionalnoj afričkoj kulturi**

Sažetak

Ovo je studija induktivni pristup istraživanju i stjecanju znanja o prirodi u afričkoj kulturi. Počinje, bez ikakve pretpostavke o predznanju, ali bez ikakvog pretjeranog povlađivanja, kratkim izlaganjem značenja indukcije. Analizira, poništava i odbacuje argumentacijske pokušaje koje su nedavno iznijeli neki znanstvenici da indukcija nije dio afričke sposobnosti rasuđivanja, da je ekskluzivna za Zapad i da je većina tradicionalnih vjerovanja iracionalna, praznovjerja i neinferencijska. Nastavlja se kratkom analizom afričkog bavljenja induktivnim razmišljanjem, a zatim povezuje indukciju i prirodni okoliš konkretnom analizom nekih načina na koje Afrikanci razumiju i stječu znanje o prirodnom okolišu putem induktivnog zaključivanja, posebno u tradicionalnom afričkom društvu. Izvedeno je demonstrativno istraživanje ovih načina u kontekstu medicine, poljoprivrede, znanosti, tehnologije, vremena i godišnjih doba, među ostalim, i o tome kako takvi obrasci mišljenja i rezultirajuće znanje informiraju afrička vjerovanja i prakse. Studija istodobno tvrdi da je afričko induktivno razumijevanje prirode demonstracija induktivne kreativnosti, vještina i sposobnosti tradicionalnih afričkih naroda. Zaključuje se tvrdnjom da ako se utvrdi da tradicionalni Afrikanci induktivno stječu znanje o prirodi i pokaže kako se to znanje stječe, istodobno bi se utvrdilo da su Afrikanci sposobni za induktivnu logiku, čije komponente uključuju zaključke i racionalnost. Studij usvaja konceptualne i kritičke metode filozofske analize.

Ključne riječi

tradicionalno, Afrika, afričko, indukcija, iracionalnost, racionalnost, praznovjerje, induktivna oštrunost, prirodno okružje, indukcija prirode

Felix Ayemere Airoboman

**Induktive Untersuchung der Natur
in der traditionellen afrikanischen Kultur**

Zusammenfassung

Diese Studie ist ein induktiver Ansatz zur Untersuchung und dem Erwerb von Kenntnissen über die Natur in der afrikanischen Kultur. Sie beginnt, ohne jeglicher Annahme, dass man über Vorwissen verfügt, aber auch ohne übertriebener Nachsicht, mit einer kurzen Darlegung der Bedeutung der Induktion. Sie analysiert, tilgt und verwirft die versuchte Argumentation, die vor kurzem von einigen Wissenschaftlern dargelegt wurde, dass die Induktion kein Teil des afrikanischen Denkvormögens sei, dass sie ausschließlich dem Westen gehöre und dass die Mehrheit traditioneller Glauben irrational, abergläubisch und nicht-inferentiell sei. Es wird mit einer kurzen Analyse der afrikanischen Befassung mit dem induktiven Denken fortgefahren. Danach werden die Induktion und die natürliche Umwelt miteinander verknüpft, durch eine konkrete Analyse einiger Weisen, wie die Afrikaner, besonders in der traditionellen afrikanischen Gesellschaft, durch induktive Schlussfolgerung die natürliche Umwelt verstehen und Kenntnisse über sie erwerben. Es wurde eine demonstrative Untersuchung dieser Weisen im Kontext der Medizin, Landwirtschaft, Wissenschaft, Technologie, Zeit und Jahreszeiten, unter anderem, durchgeführt, und auch darüber, wie solche Denkmuster und daraus resultierende Kenntnisse die afrikanischen Glauben und Praxen informieren. Die Studie behauptet gleichzeitig, das afrikanische induktive Verstehen der Natur sei eine Demonstration der induktiven Kreativität, Fähigkeit und Kompetenz traditioneller afrikanischer Völker. Es wird mit der Behauptung geschlussfolgert, dass, wenn man feststellen würde, dass traditionelle Afrikaner Kenntnisse über die Natur auf induktive Weise erwerben, und zeigen würde, wie diese Kenntnisse erworben werden, würde sich gleichzeitig feststellen, dass die Afrikaner zur induktiven Logik, zu deren Komponenten auch Schlussfolgerungen und Rationalität gehören, fähig sind. Die Studie übernimmt konzeptuelle und kritische Methoden der philosophischen Analyse.

Schlüsselwörter

traditionell afrikanisch, Induktion, Irrationalität, Rationalität, Aberglaube, induktive Scharfsinnigkeit, natürliche Umgebung, Induktion der Natur

Felix Ayemere Airoboman

**Recherche inductive de la nature
dans la culture traditionnelle africaine**

Résumé

Cette étude est une approche inductive en vue de rechercher et d'acquérir la connaissance de la nature dans la culture africaine. Elle débute, sans présomption de connaissances préalables, et sans excès, en exposant brièvement la signification de l'induction. Elle analyse, désamorce et rejette les tentatives argumentatives émises récemment par certains érudits selon lesquels l'induction serait absente de la faculté africaine de raisonnement, étant l'exclusivité de l'Occident, et la plupart des croyances traditionnelles seraient irrationnelles, superstitieuses et non inférentielles. L'étude se poursuit avec une brève analyse de l'engagement africain aux côtés du raisonnement inductif, et par la suite, établit une relation entre l'induction et l'environnement en analysant de manière concrète les diverses manières dont les Africains comprennent et acquièrent les connaissances de l'environnement naturel à travers le raisonnement inductif, en particulier dans la société africaine traditionnelle. Une investigation démonstrative de ces démarches est menée avec la médecine, l'agriculture, la science, la technologie, le temps et les saisons, entre autres, et s'attache à montrer comment de tels schémas de pensées, ainsi que la connaissance qui en résulte, instruisent les croyances africaines et les pratiques. En parallèle, cette étude fait valoir que la compréhension inductive africaine de la nature est une démonstration de la créativité inductive, des savoir-faire et compétences du peuple traditionnel africain. L'étude s'achève en affirmant que s'il est établi que les Africains traditionnels acquièrent les connaissances sur la nature de manière inductive, et montre comment ces connaissances sont acquises, il serait possible à la fois d'affirmer qu'ils sont capables de se servir de la logique inductive, dont les seules composantes impliquent la présence d'inférences et de rationalité. L'étude adopte la méthode conceptuelle et critique propre aux analyses philosophiques.

Mots-clés

traditionnel, Afrique, africain, induction, (ir)rationalité, superstition, perspicacité inductive, environnement naturel, induction de la nature