NEWTON'S PRINCIPLE OF FORCE AND ITS CORRELATION TO BEING IN AFRICA

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Abstract
The correlation between Newton's principle of force and Being in Africa is comparatively analytical despite its physical and descriptive nature in contrast to the metaphysical disposition of Being in Africa. The paper argues this by showing three fundamental characteristics that force portends. These are motion, change and causality. Motion, change and causality are principles discussed in science, yet are arguably located within the purview of metaphysics. This paper examines that the two different concepts of force and Being can be used to understand the disposition in Africa as scientific and metaphysical. Whereas motion, change and causality in science can be explained as physical properties, this paper suggests that they can also be metaphysically explained. The mechanical aspect of Newton's force is a product of mass and acceleration. Force, comprised of mass on the one hand, is physically explanatory whereas acceleration is not necessarily so. And it is from this mechanical disposition that the metaphysical inclination of Being received credence in African science. It is the tuning fork of force that defines Being. Obviously, then, Force = Being. This mathematical proposition provides an existential backdrop to the ontological status of the so-called traditional African. The African therefore has a mathematical status that shows his predisposition to be viewed as a unit in a group of forces. This paper suggests that, though abstract in nature, Being can be understood by using a scientific model such as Newton's force when applied as a practical theory with concrete descriptions. The paper employs a comparative analysis in bringing this correlation to fruition.

Keywords: Newton, Force, Being, Science, Metaphysics, Africa.

Introduction
No matter the measure of criticisms thrust against Placide Tempels from all sides, his conception of Being in Africa as force remains a valid position. Essentially, the nature of Being in Africa is not conceived in isolation, but rather as a group of forces that can be philosophically and scientifically explained. The nature of these forces bear significance in relation to Newton's mechanics because of their dynamic principles. Thus, the subatomic entities contained in these forces enables Being to create and change under the realm of Becoming (Obi 56). With respect to Newton's law of motion, where force is seen as a product of mass and acceleration (F = ma), the principle of force in Africa bears a logical nexus with Newton's mechanics because Being can be seen within the purview of both physical and metaphysical dimensions. This is a consequence of mass being (no puns intended) more of a physical entity as it can be subjected to physical conditions like measurement; whereas acceleration on the other hand seems metaphysical in regards to assumptions. Mass and acceleration are therefore mathematically attached under production. An individual in Africa is seen as a cog in a wheel of forces (Aja 234) because he is mathematically attached as a unit to these forces. This connectedness is akin to the scientific laws that governs objects in Newton's principle of inertia, for example, whereby a body at rest will continue to be at rest and a body in motion will continue to be in a state of motion, except acted upon by an external force. This is precisely the African predicament. As a being, he will act or not act as an object in a series of events unless as directed by a composition of forces. Actions are thus causally necessitated by forces in the African cultural milieu. This paper aims at connecting
the dots between Newton's mechanics and the nature of force in Africa in order to show that Africans are not unscientific as erroneously believed.

**A Metaphysical Interpretation of Newton's Principle of Force and Being in Africa**

The relationship between Newton's principle of force and Being in African is stipulated to be explanatorily potent by showing its empirical verifiability. Isaac Newton (1642-1727) formulated principles that express the laws of how forces determine the motion of bodies (Loewer 327). Newton and physicists following him were able to account for how forces determine the behaviour of physical bodies. Being metaphysical in spirit, African forces have resultant effects on Beings. Newton's physics is not just a physical theory, but when applied to African philosophy, bears fundamental imprints of metaphysics. For Being to exist in Africa, therefore, it must have force. Impersonal in nature, too, it serves as a reminder why Africans are socialists. Also, this force enables the African to explain the present from the past with respect to time. Thus, subjected to a matrix of forces, these culminate into a mechanically deterministic principle that govern the thoughts and beliefs of the African.

Now, as Burtt had shown us in his book, *The Metaphysical Foundation of Modern Physical Science* – which was published in 1925 – that physical science possesses a predilection of metaphysics in its formulation. This is instructive for understanding force and its relation to Being. The position that the principle of mechanics in Newton in terms of force is instructive for understanding force in Africa cannot be overemphasized. Newton defined force as the cause of change in motion. Three important concepts from Newton's definition of force include "cause", "change" and "motion". These three concepts will form, basically, a tripartite and act as a troika in our proposition of force. Although Tempels was faulted in his objectification of conceiving Being into a frozen object like a mass of ice, it nevertheless implies that being can serve material and physical purposes. For instance, aesthetic objects in the philosophy of African art must serve some purpose despite being objects of romantic interest. Within the world of matter, the forces under the spotlight are engaged in interaction, which pontificates their impersonality and communal predilection.

The communion of forces elucidates why the "I am because we are" notion is paramount in understanding African reality. The principle here is simply mechanical: when several forces act simultaneously, the effect is like each acted in turn. Causal powers are thus clearly connected to the behaviour of forces. And it is in view of this that African forces exhibit the characteristic of regularity. This self-same regularity can also be found in Newton's concept of mechanical force (e.g. \( F = ma \)), according to Maudlin's (124) metaphysical account. Although, according to Doppelt (310), the triumph of Newtonian mechanics meant a genuine empirical knowledge depends on strict inductive generalization from observed phenomena, it does not mean that forces should be categorized as speculative hypothesis since they bear the hallmark of standard and genuine scientific knowledge.

Furthermore, the nature of forces in Africa is seen as an extension of the self. It is an extension of one's Being just as Newton's force is seen from the dynamic perspective of a mechanism: a system of parts that interact with each other to produce those phenomena in Beings. This is why the place of the family plays a pivotal role in Africa as a family becomes a sort of mechanism for self-projection and transcendence (Zahan 128). One does not live for one's self alone, but coexist in the midst of the other forces for self-affirmation. This metaphysical interpretation of Newtonian mechanics rest on two claims: (i) explanation of present events must invoke the past events; and (ii) the behaviour of the forces must be explained by the contact interactions of their constituent parts. The implications of being as force is therefore suggestive of three cardinal points in Newton's definition of force – cause, change and motion. Diagrammatically, they can be annotated and shown in the figure below:
The triadic representation of force above implies that these three components are very vital in expressing how this mechanism produce all the phenomena we witness within the realm of African ontology.

**Motion**

According to Newton’s first law (the principle of inertia), everybody continues in its state of rest or uniform motion unless its state is changed by an applied force. A body's motion is defined with respect to those other bodies in direct contact with it, energy transfer and most importantly, time. The Tempelsian notion of Being as force implies that we are referring to mobile beings. The essential quality of Being as force stipulates this dynamic nature of Being in Africa that enables it to transcend over merely being static. The ontological status of Being in Africa is hinged upon mobility. And apparently, a Being at rest will never move until something else moves it. However, even when this Being is at rest, it is potentially in motion. From this said potential state, it can then be moved to actuality. The phenomenon that is chiefly responsible for the transformation of potentiality into actuality is force. The inertial framework of Being here is hinged upon the notion of Becoming. Being as becoming can be interpreted from the Newtonian perspective of motion in that Being can affirm itself as becoming in terms of its dynamism. Force represents a mechanism in a Being that alters its static disposition and thus furnishes it with the prospect of aspiration.

The Newtonian notion that a body's motion is defined with respect to those of others bodies in direct contact with it signifies impersonality. The scientific ontology of force in African philosophy is to exist as an interactive unit. Being seems to affect each other as a dynamic principle for existence due to communion of souls as forces. The principle of inertia in relation to African forces appears much rather deterministic than free because being in Africa is usually seen as a cog in a wheel of forces whereby a cog cannot dictate the state of motion for others as a result of logical consciousness. The consequence of this has ethical implications since moral tenets in Africa are based on the interaction of forces. This is precisely why the nature of being cannot be conceived in isolation. The other forces in contact with it define the derivation of existence for it. Therefore, if a Being’s state of motion is not in perfect harmony with that of other forces, it is bound to topple the equation.

Motion, explained through energy-events, means that there is a transfer of energy from past events to present ones (Obi 77). Also, it means that one event can causally influence another event as these forces dictate. Force acts as a tuning fork that moves thoughts in the form of energy in order to spur creativity and change. As a stream of consciousness, thought itself flows in motion like Bergson’s *elan vital* from whence emerges life and all its creative possibilities (Stumpf, 438). Noteworthy is the fact that these thoughts can be passed from one being to another indicate how energy can be dissipated in various forms. Since Being is force, then energy as motion is expressed in the being itself. Energy, it was once conceived, can neither be created nor destroyed, but can be converted from one
form to another. This law of conservation of energy also states that every event is perceived as a conservative process. As such, energy transfer in events can be conceived in the continuous stream of a process with respect to beings in Africa. As a derivative of force, energy is also an essential component of being because it is in the form of thought. Thus expressed as thought, this energy is passed from past events to present ones in a state of motion that is reminiscent of Newton's law of inertia. Within the realm of gods and ancestors, there is a transfer of energy as thought from past events to the present. Thus, they act as custodian of the law, ensuring that the order and harmony in the African cultural milieu is maintained and preserved. The African belief in reincarnation is also an aspect of how energy can be transferred with regards to retrocognition and behavioural patterns.

The notion of time in Africa, as proposed by Mbiti, to be sure, is seen as an energy-event between the past and the present solely because the African is determined by the nature of these forces in motion. The African presentist thrives in ritual passages, the science of divination as well as the science of medicine because he sees these events as an outcome of what the forces portend. Investigating these aforementioned factors, one would discover that there is knowledge-transfer from past events to the present ones as being engaged in motion through the course of time. This is why scientific essentialists in Africa should conceive Newton's law of mechanics as being metaphysically necessary, like Ellis (144).

The linear nature of time for African presentists implicitly suggest how the state of events proceed. Beings persist through time because they are in motion of Becoming. In the philosophy of time in Africa, a being's existence is defined by force as it seeks to conquer time through a repititive cycle of motions. Motion, in this sense, enables the force to assume the metaphysical necessity of process. The process involved is continuous as this force is transcendent. It is also by reason of this process that aesthetic objects derive their significance. Since these ontological forces are involved in the creative process of the object, the aesthetic object's purpose is to serve some function. Once this function is achieved and the art object no longer serves a purpose, it is cast away (Ome 186).

Change
Newton's second law states that the rate of change of momentum is proportional to the impressed force and takes place in the direction of the force. Change implies the propellant nature of force that is responsible for becoming in beings. And the progress of a being is in becoming. Change in being, according to Obi (57), implies becoming. As a principle of force, the momentum of change is metaphysical in the sense that being is simply affirmed in the direction of force. In the grand scheme of things, the flux of change also enables the nature of being to be very dynamic. In addition, if beings tilt in the direction of force, as dictated by change, there is bound to be order and balance. Considering Newton's law, the word "proportional" suggests this order and balance because the change experienced in the being and the direction of force ensure that they are intimately harmonized. As aforementioned, this is reminiscent of Tempels' conception of being as force that can mathematically be stated as Being = Force.

The state of event for a being cannot possibly remain the same. As a process, change is essential if the assertion of beings is to achieved. It is change that thus enables beings to experience diverse possibilities to be basically harmonized with the reality of disjointed events. The implication of change here rests with the notion that it is involved in the business of establishing unity even when diverse phenomena intend to portray otherwise. Stumpf (13) puts it this way: "Things change and thereby take on different forms, but, nevertheless, they contain something which continues to be the same throughout all the flux of change." The cosy image from this quote is that even when things take different forms as a result of the phenomenon of change, it is in the cause of unity that they remain the same.
through the process. We turn to the late poet of Igbo descent, Christopher Okigbo (7), who stated in *Distances IV*:

After we had formed  
Then only the forms were formed  
And all the forms  
Were formed after our forming

Okigbo's verse is instructive in showing the transformation of beings in the process of change. The forms, as symbolic representations for being here, are able to assume diverse dimensions because change is involved. They simply transform. Citing Newton's momentum, the African predicament is presented as a determination of force in action that are intricately involved in changing disorderly events by turning variance into an agreeable state. It is with respect to this phenomenon that reincarnation can surface. Reincarnation, under the process of change, can be interpreted as the harmony of life and death. As a case for duality, though opposite and contradictory, the momentum of change enables Being to fashion out the material of life from death and vice versa. This is reminiscent of Soyinka's (189) poem on *Abiku*: "In the silence of webs, Abiku moans, shaping/Mounds form the yolk." The poem, taken from Nwoya's *West African Verse*, was suggestive with regards to how the image of the mound represents the grave and death, while the yolk indicates the beginning of life. Hence, in the lines stipulated, there is the shaping of death out of the material of life. This is how harmony of opposites is achieved by the dynamism represented by the momentum of change. The change in this form is a transformation from life to death and from death to life. This is an epitome of how beings seek to overcome the temporality that occurs in the state of events. As mentioned before, the state of events for a being cannot possibly remain the same, which is why what beings experience by virtue of change is simply a philosophical and scientific rendition of permanent bonds on temporary basis. What is chiefly responsible for this doctrine is force.

In African philosophy, metaphysical forces are engaged in communion in order to enforce the concept of change. And the more things change, the more they remain the same. Oddly ironical, it is what informs the African habit of being notoriously religious because the African concept of change is based upon pragmatism. Thus, the African is flexible regarding his religious affiliation since he is given to change provided results are achieved. The sameness mentality here is viewed from the perspective that his religious cravings remain in order. Since results are what the African desires, whatever religious tenet can promise and bring them to fruition makes the African flexible to accept change in order to explore diverse possibilities presented to him. This belief, often dismissed as primitive, is actually scientific because, for the African, it is important to seek out innovative and novel ideas for dealing with problems. Pragmatism, under the context of change, implies that all that matters for Africans is the much-needed solution. Theoryrelated changes in science are not any different from this philosophical conception in Africa – at least, that is what Thomas Kuhn would have us believe in his celebrated *Structure of Scientific Revolutions*. Kuhn's claim was that it is a revolution of thought that separates different successive theories in science due to paradigms that involve different mythological standards.

As a feature of being, change is synonymous with science because it simply means that if something is not working, one's best bet is to change it. In the state of flux and reflux, therefore, force act as an impulse that drives the being to seek for change. To alter any state of events that appears awry, the cosmological tendency of being is heavily reliant on force for self-affirmation. This principle of force is in semblance to Newton's because the momentum of change in the being is conceived in the same direction as the force propelling it. The propensity of a being to act this way is not farfetched from its quest to assume the metaphysical powers at its disposal. Prime examples of this belief can be seen in ritual
passages, divination and the use of herbs for medicinal purposes. Thus change is embraced by beings in African philosophy as against permanence in order to create a balance in reality through the feasibility that pragmatism can afford.

Causality
Newton's third law states that to every action, there is an equal and opposite reaction. Animated by force, the nature of being is to act and react. Also, Newton's proposition here stipulates the harmony of opposites experienced in beings. More importantly, the presence of forces possess causal powers in dictating African reality, which is why we often see their manifestations in perennial metaphysical and epistemological concepts such as causation, determinism, natural phenomena, time and space, duality as well as change. Often thought as unscientific, causality still appears as commonplace in establishing scientific beliefs. After all, it bears the hallmark of induction and probability. If the laws of mechanics are interpreted from a probabilistic and inductive manner, they can go a long way in helping to solve the problems in causation that stems from distinguishing between genuine causes and accidental causes or distinguishing between causes and effects respectively. To investigate this, we can examine the Yoruba concept of causality in the case of a witch who cried last night and a child who dies the following morning (ájé kẹ l'áná omo kú loníi). The question that then follows is usually put in such a way that one is expected to see the relation between the witch crying and the simultaneous death of the child: who does not know that the witch killed the child? (Táni ọ mọ wi pe ajé lọ pa omo je?). It is not scientifically possible to associate or link the crying of the witch last night to the dying child the following day. It is possible that the cause of the child's death may be due to something else and not essentially the witch's cry. It is in this case that the laws of mechanics here appear probabilistic rather than deterministic.

The metaphysical disposition of being is immersed in causality due to the nature of being to act and react under the influence of force. Projected in this way, causality is embedded in the very nature of being. Just like Newtonian mechanics, where action and reaction are equal and opposite, in the African conception of being, opposites are also harmonized. These opposites may seem to be in strife and appear to negate one another, but since appearances are deceptive, on closer inspection they are harmonized in being. Simply put, cause is seen in the action and its resultant effect is seen in the reaction, as Newtonian law indicates. Beings are therefore causally dependent on forces. Newton's mechanics thus suggests that it is from force that our idea of causality is derived: that the causes witnessed will be invariably followed by their effects in equal and opposite proportions. The theory of process, established from the position of Being as Becoming, implies that causal process is continuous.

Still harping on the concept of harmony with regards to the action and reaction of being as force, interestingly there are ethical implications that emanate if this harmony is breached. Since an individual Being as force derives his existence from other group of forces, ethical misconducts are punished by measure of an action spurring a counter reaction so that the state of harmony can be properly maintained. The place of force is thus paramount in African moral tradition. For if actions are not adequately checked by reactions, the state of the society will head on a collision course to ruin. It is such checks and balances that ensure continual existence of these forces. As metaphysical entities, they act as deterministic principles that strive in constant harmony in stimulating ethical principles that all individual forces will need to abide by. It is as such that ethical relativism or situationism cease to be the guiding principles in the African cultural milieu (Aja 235). Derivation of laws are also owed to the harmony that these essential forces “push and pull” to maintain.

The predisposition of African forces is not windowless like Leibniz' nomads. More appropriately, they are full of windows to mirror one another so that they can attain the principle of dynamics: they affect each other. This is precisely why there is interaction among
African forces. If there were no interaction between them, action and reaction will be nearly impossible. Due to their interaction, they have causal relations to each other. It is as a result of this that Africans portray socialist tendencies as seen in their political theories. Ezeulu's tragic flaw in Chinua Achebe's *Arrow of God* is an indication that no man can defeat his kinsmen and their gods. This is how causal relations score a very decisive point in emphasizing the infinite family of forces in African philosophy. The forces may act and react as if they are involved in some form of variance, but the major purpose is to attain agreement. This notion is hinged upon the basis that without action, there would be no reaction, consequently explanatory as metaphysical opposites.

It is not philosophical and scientifically possible to divorce causality from the scheme of force. As previously annotated, the behaviour of forces must be explained by the contact interactions of their constituent parts. If this is the case, then, as a result of cause and effect, this said interaction is set to culminate into, and is responsible for the existence of these metaphysical opposites. The logical connection here is quite understandable if we contemplate this from examining Being as existing in isolation. If being is seen from the purview of isolation, it means it is not a determinate entity since it is not interactive with other forces. The forces in Newton's mechanics are seen in interaction like African forces, hence they act and react with each other. But if the Being as a force is considered to exist in isolation, action and reaction will not be possible, therefore there would be no reason for causality. Whereas the witch's cry and the death of the child may be termed as merely accidental in Western philosophy, it is not exactly so in African philosophy since forces are said to interact under the Newtonian concept of action and reaction.

It is noteworthy to establish here that cause and effect coincide within the framework of time in Africa. Thus, causal influences always move from the past to the present. The pantheon of gods and the cosmology of ancestors act as "push and pull" agents that are often held responsible for the causal phenomena witnessed in the African society. This interactive system of action and reaction is usually linked to their governance with respect to the precedence of time in causality. And this is what makes causality authentically scientific in African society.

**Evaluation**

This paper may be criticized for using Isaac Newton, a foreign scientist of British descent, for analyzing the concept of force as Being in Africa. However, it is worthy of note to point out that African science has been demonized in favour of Western science, which has made it a rather herculean task in seeking out any proponent of genuine African science in establishing the claims made in this work. The challenge, therefore, is for African scientists to tap into the rich and deep heritage of her roots in order to find a veritable platform that can explore the potentialities embedded in science and technology. Applying African philosophy to do this is necessary and essential. For example, the unification of chemistry and physics, as seen in Pauling's theory of valency to quantum mechanics is instructive in the sense that physics and philosophy can also find common grounds. In addition, although quantum mechanics may have leapfrogged Newton's mechanics, this work was restricted to Newton's law of motion. These laws should be regarded as metaphysically necessary in establishing the reality of the African entity. Newton's laws are essentially drawn from physics but present philosophic and scientific significance in the African modus operandi such as its attention towards time, change and causality.

We have shown that these mechanically deterministic principle of forces in Africa are very similar to Newton's. Force, as conceived by Newton, as the cause of change in motion, has been divided into these three components of "cause", "change" and "motion" in this work. Using each of Newton's three laws respectively for each of these components, beginning with motion, change and, lastly, cause, to elaborate on why Beings in Africa act the way they do. It
is these factors, inherent in beings that account for its mobility in Becoming. Bearing in mind that the potency for creativity is embedded in force, past and present events can experience energy-transfer in consonance with the principle of inertia. Conceived as thought, the flow of this energy is cyclical with respect to African perspective on time. Being as force is defined under the context of time and motion due to a quest for transcendence. This is why when energy is transferred in the form of thought from past to present events, the exploration of many basic possibilities is thrown under the limelight of pragmatism. As a scientific feature, pragmatism ensure that African forces are empirically verifiable in spite of their metaphysical characteristics.

The project of force in Africa philosophy is additionally scientific because it has the capacity to overcome the limitation posed by time and space. Momentum is seen in this regard as the compelling nature of force that animates being in order to thrive beyond spatio-temporality. Though abstract in nature, force possesses the propensity to achieve a conquest over space-time barriers. Such can be derived in the philosophical undertone of permanent bonds on temporary basis (awon idapo pipe ni ona aipe). Space and time are closely linked, and often the same word is used for both in African philosophy as content defines space and time. The existential predicament of contingency means that, to see more clearly what sort of entity beings are as a product of force, these limitations have to be confronted so as to open possibilities of self-liberation. To delve back to Newton's second law, where a change in momentum enables the body to move in the direction of the applied force, the concrete description to bring this theory to light can be seen in reincarnation.

The mechanics of Newton's law posits that there is a logical connection between causal processes and interaction of forces. This account for the kind of intersections proposed by Salmon (127) whereby the interaction of the forces account for causality by virtue of the disposition of force to act and react. This causal mechanical phenomenon in a Being enables it to go through the process of Becoming. To put it blatantly, these forces possess causal powers, and are therefore capable of influencing events. This is why divination, for instance, is a common practice in Africa. The mechanism of forces can cause, bring about or produce events in similar fashion as they do in science. This shows why forces and causality are closely related. Forces are mechanistic due to their ability to interact. And this is how they are responsible for the disposition of being. Hence, it is one thing to assert Being as Becoming; it is another thing to show how exactly. However, this metaphysical theory of Becoming – in relation to the mechanical of interaction of forces and causality – is quite ontological because accounting for the energy levels involved is pure rocket science.

Dynamism and pragmatism are not the only "isms" involved with the Newtonian concept of force in the African context. There is also determinism, too. Seen as a sort of mathematical unit, an individual in African philosophy is simply a unit among these group of forces. As a member of a family and a community, the metaphysical implication is that he is mechanically determined by the dictates of the group to which he belongs. Due to the interaction of these forces, a unit of this group is not expected to opt out at will. Sticking with the rest of the other communion of forces will therefore determine his ethical values, for instance. Regularity and harmony are the hallmarks on which the African foundation is built, which is why aff a single unit of this force disrupts balance of the rest of the congregation, the mechanical tendency is to react to that given action in equal and opposite proportion. The communion of forces in African metaphysics is simply more important than an individual force. The reason behind this is hinged upon the fact that the individual force derives its existence from other forces, and consequently affects other forces by its action.

The African ontology of forces presents a model for understanding being. Nevertheless, Newton's laws, as we have shown in this work, can also up the ante by ensuring that this concept exhibits both scientific and philosophical inclinations. If being can be seen as an object within a state of events, it is not a reductionistic theory by any means to
apply these laws of Isaac Newton's in an attempt to broaden the comprehension of being altogether. In retrospect, these laws are metaphysically necessary.

Conclusion
The argument that the principles of mechanics in Newton are instructive for understanding the nature of force in Africa cannot be overemphasized. The physics of forces has philosophical implications for the metaphysics of being. Taking that into cognizance, the onus lies in investigating how much being utilizes of this force. Motion, change and causality may be essential characteristics of this force, but the list is by no means exhaustible. Force, as aforementioned, is what is responsible for dynamism in being as Becoming. And it is emphatic to point out the principle of dynamics in itself serves its own merits for the African entity. The equivalence of being as force in Tempels' conception may have raised a lot of eyebrows among several African philosophers, but his position shows compatibility with science. With this in mind, it is not out of place to state that Newton's physical science itself was founded upon metaphysical foundations. Consequently, we can use this metaphysical foundation for establishing the reality of the African entity. In a nutshell, Newton's force and its implications for African philosophy represent a scientific model for dealing with an abstract concept like Being when applied as a practical theory with concrete descriptions.

Works Cited