

Matter, Motion, and Laws of Motion of Matter

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Abstract

This article explores fundamental properties inherent in matter. It is relevant to identifying the role of matter over human consciousness and the development of the universe. The article addresses the research problems concerning the primacy of matter or consciousness, mutability or the immutability of the matter, and law-abided or random motion of matter. The article deals with the research problems through the review-based analysis of the dialectical materialistic critique of the basic properties of matter. The article reveals that matter is primary over consciousness and there is nothing immutable in the universe. Motion is inherent in a matter and it is law-abided. There are two contradictory aspects inside a thing and the unity between them is relative and the struggle is absolute. A thing comes to its qualitative change through its quantitative change and the qualitative change leads the thing to new quantitative change for the new qualitative change. The thing moves to a new stage of development negating the old one and after several negations, there is the repetition of the first one. This repetition does not signify just the replacement of the old one, but it will be more advanced both in quantity and quality.

Key Words: matter, motion, negation, qualitative, quantitative, struggle, unity

Introduction

There are two world-outlook; materialism and idealism. They have opposite views on the matter. The matter is primary for materialism, while idealism takes consciousness as primary. There are two approaches to the phenomena of matter; metaphysical and dialectical. Metaphysics apprehends matter as immutable, while dialectics believes in the motion of matter. Marxism combines materialism and dialectics into an organic unity of dialectical materialism. This article observes the inherent properties of matter through the lens of dialectical materialism. Dialectical materialism refutes the idealistic and metaphysical views on matter emphasizing it as the root of human consciousness and as a mutable entity. The matter or the objective world, according to dialectical materialism, existed before there were any living creatures and the present world is the result of the continuous evolution or development from the lower stage to the higher one. The universe is not created but existed; therefore, there is no role of God in the creation of the cosmos, but unity and struggle

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between two opposing forces inside the objective world are responsible for its existence and development. There is a continuous movement inside a thing and this movement, guided by its own laws, leads a thing to a higher stage of development. A thing develops through a series of quantitative and qualitative changes and comes to a new stage of development by negating the old ones. The article, using dialectical materialism's methodological tools, examines these various aspects of the matter.

Primacy of Matter

Dialectical materialism views matter as a fundamental category. The central debate in all philosophies is whether matter or consciousness comes first. The term "matter" refers to the physical universe outside of the human mind. Vladimir Ilyich Lenin defines matter precisely as follows: "Matter is a philosophical category denoting the objective reality which is given to men by his sensations, and which is copied, photographed and reflected by our sensations, while existing independently of them" (*Collected* 130). The objective reality is the matter; it is mirrored in the human brain and contributes to the formation of human cognition and consciousness. In *Anti-Duhring*, Frederick Engels states: "Thought and consciousness are products of the human brain" (55). In *Ludwig Feuerbach and the End of Classical German Philosophy*, Engels reiterates the same idea:

The material, sensuously perceptible world to which we ourselves belong is the only reality; and that our consciousness and thinking, however supra-sensuous they may seem, are the product of a material, bodily organ, the brain. Matter is not a product of mind, but mind is itself merely the highest product of matter. This is, of course, pure materialism. (21)

Engels emphasizes the fact that the sensually perceptible world is the only reality and that our consciousness, which is a byproduct of the material world as it is mirrored in the human brain, is a secondary reality. The human mind does not create matter; on the contrary, substance creates mind. In *Materialism and Empirio-Criticism*, Lenin develops this idea:

One asks, how can sane people in sound mind and judgment assert that "sense-perception [within what limits is not important] is the reality existing outside us"? The earth is a reality existing outside us. It cannot "coincide" (in the sense of being identical) with our sense-perception, or be in indissoluble co-ordination with it, or be a "complex of elements" in another connection identical with sensation; for the earth existed at a time when there were no men, no sense-organs, no matter organized in that superior form in which its property of sensation is in any way clearly perceptible. (*Transcendence* 125)

The earth existed before there were any men or sense organs, hence no reasonable person, according to Lenin, can assert that sense perception is the reality that exists outside of us. Lenin adds: "Natural science positively asserts that the earth once existed in such a state

that no man or any other creature existed or could have existed on it. Organic matter is a later phenomenon, the fruit of a long evolution” (“Nature” 75-6). The first and most crucial requirement for a materialist is hence the acceptance of the independent existence of the material world, distinct from human awareness.

The dialectical approach sees connections between everything. It holds the opinion that no natural phenomenon can be understood in a vacuum from related occurrences. Joseph Vissarionovich Stalin highlights:

Contrary to metaphysics, dialectics does not regard nature as an accidental agglomeration of things, of phenomena, unconnected with, isolated from, and independent of, each other, but as a connected and integral whole, in which things, phenomena are organically connected with, dependent on, and determined by, each other. (2)

The physical universe is made up of a network of connections between all things. B. I. Syusyukalov et al. explain: “In other words, there is no such thing as ‘empty’ space or absolutely isolated things. The material world is a single interconnected system whose every element interacts with other elements” (“Matter” 36). The material oneness of the world is the prerequisite for the growth of a thing. This involves changes from the simple to the complex through the motion of matter.

Motion of Matter

The second innate attribute of matter, according to dialectical materialism, is motion. The dialectical method holds that matter (i.e., nature) is not in a state of rest and immobility, stagnation and immutability, but is instead constantly in motion and change, renewal and development, with something always developing and something continually dissolving and withering away (Stalin 2-3). The theory of motion of matter places dialectical materialism in stark opposition to philosophical idealism and the theological ideas of religion. Mao Tsetung clarifies:

Dialectical materialism’s theory of movement is in opposition first of all with philosophical idealism and with the theological concepts of religion. The fundamental nature of all philosophical idealism and religious theology derives from their denial of the unity and material nature of the world; and in imagining that the movement and development of the world takes place apart from matter, or took place at least in the beginning apart from matter, and is the result of the action of spirit, God, or divine forces. (“Dialectical” 184)

Contrary to the theory of dialectical materialism, idealism and theological ideas of religion reject the notion that the motion of matter is necessary for its evolution and change. Instead, they credit spirit, God, or other divine forces to the infrequent changes or developments in the matter. They reject the idea that matter is in motion as it develops and changes.

Dialectical materialism views motion or movement as an integral component of matter because it maintains that there is no existence of matter without motion. In his *Dialectics of Nature*, Engels states: “Motion in the most general sense, conceived as the mode of existence, the inherent attribute, of matter, comprehends all changes and processes occurring in the universe, from mere change of place right up to thinking” (“Basic” 69). The primary cause of all changes and processes in the cosmos is the motion of matter. There is no such thing as spirit, God, or divine forces, and none of them play any part in how matter changes or develops. All things in this material universe are prone to change since there is never even a brief pause in the motion of matter. Georgi Valentinovich Plekhanov contends: “The basis of all the phenomena of nature is the motion of matter.” Plekhanov believes that all change or evolution in nature can be attributed to the motion of matter. He continues: “. . . in dialectics there is nothing immutable; everything is moving, everything is changing” (87, 102). Contradictions exist in matter, and the conflict between two aspects of contradictions is what causes a substance to move and evolve. Mao acknowledges: “The life of dialectics is the continuous movement toward opposites” (“Talk on Questions” 54). The two opposing elements of a contradiction are perpetually at odds with one another in a fight for supremacy. This indicates that the matter is constantly changing, but the dialectic claims that this change and development occur within specified laws rather than randomly.

The Basic Laws of Motion

The matter evolves and changes in accordance with its own laws. Matter changes and develops as a result of its fundamental properties. Every change in the external material world is primarily caused by the internal laws of motion of matter. Dialectics posits the following three fundamental laws of motion:

(a) The Unity and Struggle of Opposites

This is the basis of the law of motion. It is the foundation of motion, upon which the other two laws are based. This law emphasizes how contradictions exist in matter on a universal scale. In *Anti-Duhring*, Engels states: “Motion itself is a contradiction” (“Dialectics. Quantity” 152). This statement by Engels captures the heart of this law because it argues that “. . . contradiction exists in the process of development of all things, and . . . in the process of development of each thing, a movement of opposites exists from beginning to end” (Tsetung “Contradiction” 91). Contradictory parts of everything are interdependent, and the battle between these aspects dictates how things live and grow. The foundation of both simple and complicated kinds of motion is a contradiction. In *Anti-Duhring*, Engels examines:

If simple mechanical change of place contains a contradiction, this is even truer of the higher forms of motion of matter, and especially of organic life and its development. We saw above that life consists precisely and primarily in this – that a living thing is at each moment itself and yet something else. Life is therefore also

a contradiction which is present in things and processes themselves, and which constantly asserts and resolves itself; and as soon as the contradiction ceases, life, too, comes to an end, and death steps in. ("Dialectics. Quantity" 153)

Every form of motion contains a contradiction, including organic life. The existence of matter depends on contradiction since without it, matter ceases to exist. The following illustration shows how contradictions are present everywhere:

In mathematics: + and –. Differential and integral.

In mechanics: action and reaction.

In physics: positive and negative electricity.

In chemistry: the combination and dissociation of atoms.

In social science: the class struggle. (Lenin "Question" 280)

Everything has two sides, and those sides coexist within the same item. Lenin's above illustration demonstrates this. A thing's two sides are simultaneously in conflict and dependent on one another. One cannot live without the other.

Everything comprises opposing elements, and these elements coexist with one another in a relation of unity and struggle. However, these two relations of contradictory aspects of a thing differ in significance. Lenin clarifies: "The unity (coincidence, identity, equal action) of opposites is conditional, temporary, transitory, relative. The struggle of mutually exclusive opposites is absolute, just as development and motion are absolute" ("Question" 281). Contradictory aspects of a thing can exist in equilibrium or have an equal action up to a particular point in its development, but this equilibrium or equal action is conditional, momentary, transient, and relative. On the other hand, a contradiction's two opposing sides ". . . in every process exclude each other, struggle with each other, and are in opposition to each other" (Tsetung "Contradiction" 118). The struggle is the basic and deciding one between a contradiction's two relations. Being the primary relation of the contradiction, the struggle of opposites is absolute and ". . . it alone resolves contradictions and assures further development" (Syusyukalov "Basic" 45). The unity of opposites cannot resolve a thing's contradiction; rather, it is the conflict that does so and accelerates the evolution of a thing ahead. Lenin defines struggle as development: "Development is the 'struggle' of opposites" ("Question" 281). This denotes the significance of the struggle between the two relations of the contradictory aspects of a thing.

A thing's internal contradiction serves as its main driving force for development. The inner contradiction of a thing grows and at a definite stage, the interrelation of their aspects changes. Mao highlights: "The fundamental cause of the development of a thing is not external but internal; it lies in the contradictoriness within the thing. This internal contradiction exists in every single thing, hence its motion and development." This is not

to say that external factors play no part in how something develops. They play a part, but it is only a supporting factor in the growth and transformation of everything. Mao adds the following: “Contradictoriness within a thing is the fundamental cause of its development, while its interrelations and interactions with other things are secondary causes” (“Contradiction” 88). This suggests the significance of an object's internal contradiction for its growth and transformation. However, internal conflict has a law of its own that it follows to guide a thing's evolution and change rather than acting arbitrarily.

(b) Transition from Quantitative to Qualitative Change

This is the second law of motion, which addresses how something develops. The dialectical approach maintains that the process of growth does not occur in a circle as a simple repetition of what has already happened, but rather there is an upward and forward movement, as a transition from an old qualitative state to a new qualitative one, as a development from the simple to the complex, from the lower to the higher (Stalin 3). The growth of the natural world itself provides evidence for the applicability of dialectical rules. Engels clarifies:

Nature is the test of dialectics, and it must be said for modern science that it has furnished this test with very rich and daily increasing materials, and thus has shown that in the last resort nature works dialectically and not metaphysically; that she does not move in an eternally uniform and perpetually recurring circle, but goes through a genuine historical evolution. In this connection Darwin must be named before all others. He dealt the metaphysical conception of nature the heaviest blow by his proof that the organic world of today – plants, animals, and consequently man too – is the product of a process of evolution going on through millions of years. (“*Socialism*” 67)

Charles Darwin's studies of the organic world provide evidence for the evolution of plants, animals, and people. Evolution is the upward development of things as a result of numerous changes from one qualitative state to the next.

An object does not instantly reach its qualitative state. The only way the thing transforms from its old to new qualitative condition is through its quantitative change: “To become *qualitative*, a change must attain a certain *quantitative limit*” (Plekhanov 91). Engels clarifies it by using the well-known example of the freezing and evaporation of water:

. . . that of the change of the aggregate state of water, which under normal atmospheric pressure changes at 0° C. from the liquid into the solid state and at 100° C. from the liquid into the gaseous state, so that at both these turning-points the mere quantitative change of temperature brings about a qualitative change in the state of the water. (“*Dialectics. Quantity*” 160)

The temperature of the water undergoes a quantitative shift prior to the water evaporating or freezing, which represents a qualitative change. After the temperature of liquid water starts to rise or fall, a moment comes when this state of cohesiveness changes, and, in one case, the water turns into steam, and in the other, it turns into ice. Every phenomenon of nature and social science is subject to this dialectical law. Karl Marx provided the following illustration of how surplus value from several laborers is accumulated to produce capital:

The fact that a sum of value can be transformed into capital only when it has reached a certain size, varying according to the circumstances but in each case a definite, minimum size – this fact is a *proof of the correctness* of the Hegelian law. . . . *Because*, according to the Hegelian law, quantity changes into quality, “*therefore* an advance, when it reaches a certain limit, becomes capital”. (qtd. in Engels "Dialectics. Quantity" 159)

Only when many employees' small amounts of surplus value have accumulated, a quantitative change, can capital form, bringing about a qualitative transformation. Similar instances of this dialectical law can be found in various fields of social science.

Mao clarifies this law of dialectics by describing how there must always be two states of motion in everything, which are relative rest and noticeable change, similar to quantitative and qualitative change:

There are two states of motion in all things, that of relative rest and that of conspicuous change. Both are caused by the struggle between the two contradictory elements contained in a thing. When the thing is in the first state of motion, it is undergoing only quantitative and not qualitative change and consequently presents the outward appearance of being at rest. When the thing is in the second state of motion, the quantitative change of the first state has already reached a culminating point and gives rise to the dissolution of the thing as an entity and thereupon a qualitative change ensues, hence the appearance of a conspicuous change. (123-24)

According to the dialectical approach, everything is constantly changing, but when there is simply quantitative change, it appears as though everything is at rest. Only when there is qualitative change can one actually see and feel the change in something. Thus, harmony and unity in things represent quantitative change, while disunity and the abolition of solidarity represent qualitative change. Mao continues:

Such unity, solidarity, combination, harmony, balance, stalemate, deadlock, rest, constancy, equilibrium, solidity, attraction, etc., as we see in daily life, are all the appearances of things in the state of quantitative change. On the other hand, the dissolution of unity, that is, the destruction of this solidarity, combination, harmony, balance, stalemate, deadlock, rest, constancy, equilibrium, solidity and

attraction, and the change of each into its opposite are all the appearances of things in the state of qualitative change, the transformation of one process into another. ("Contradiction" 124)

The conflict between two contradictory aspects of anything is what causes both phases of motion. In both stages, there is no pause in the conflict, but only in the second state does the conflict find a resolution. This is the logic for the statement that the fight between mutually exclusive opposites is absolute whereas the unification of opposites is conditional, transient, and relative (Tsetung "Contradiction" 124).

The law of dialectics does not support the idea that only quantitative change results in qualitative change. They are connected in a mutual way. Mao asserts: "At any rate, quantity transforms into quality and quality transforms into quantity" ("Examples" 205). The old contradictions are resolved when a thing's quantitative change reaches its qualitative state, creating new contradictions, and the new quantitative change then starts inside the object. In objective reality and the process of cognition, there is a reciprocal interaction between quantitative and qualitative changes. Therefore, there is also a reverse transition from qualitative to quantitative changes, which implies that new qualities give objects new quantitative features (Syusyukalov "Basic" 47). The qualitative change creates a new state of quantitative change, which then results in the new qualitative change. This is the thing's development process that goes to infinity. It advances the object to a more advanced stage of development. This suggests that something develops without repetition, although dialectics also permits repetition occasionally, provided it occurs in a higher advanced condition.

(c) **The Negation of the Negation**

This third law of motion addresses how several stages of an object's evolution are connected to one another. The law of the negation of the negation, which is achieved as the replacement, the negation of one stage by another, higher, more exact and complete ones, is a law of development of the external world and a law of cognition (Syusyukalov "Basic" 50). This is the fundamental principle of dialectics, and it holds true not only in the realm of the natural world but also in the study of social science. What exactly do we mean when we talk about the law of the negation of the negation? Engels clarifies by employing the straightforward illustration of a grain of barley:

Let us take a grain of barley. Billions of such grains of barley are milled, boiled and brewed and then consumed. But if such a grain of barley meets with conditions which are normal for it, if it falls on suitable soil, then under the influence of heat and moisture a specific change occurs in it, it germinates; the grain as such ceases to exist, it is negated, and in its place there appears the plant which has arisen from it, the negation of the grain. But what is the normal life-process of this plant? It grows, flowers, is fertilized and finally once more produces grains of barley, and as

soon as these have ripened, the stalk dies, is in its turn negated. As a result of this negation of the negation we have the original grain of barley once again, but not as a single unit, but ten-, twenty- or thirty-fold. ("Dialectics. Negation" 172-73)

A grain of barley will germinate when it lands on proper soil. The plant then appears by negating the grain, and after producing ripened barley grains, the plant itself is negated. The negation of the negation brings back the original grain once again but more in quantity. However, grinding or milling the same grain will not result in the production of more grains. Engels explains: "Negation in dialectics does not mean simply saying no, or declaring that something does not exist, or destroying it in any way one likes" ("Dialectics. Negation" 180). It is required to arrange the first negation in a way that makes the second act conceivable, taking into account the specifics of each unique case. In accordance with the law of the negation of the negation, if we grind a grain of barley while only doing the first act and making the second act impossible, the grain would not produce more grains (Engels "Dialectics. Negation" 181).

Nearly all insects go through this process of negation of the negation. Engels confirms it: "Butterflies, for example, spring from the egg by a negation of the egg, pass through certain transformations until they reach sexual maturity, pair and are in turn negated, dying as soon as the paring process has been completed and the female has laid its numerous eggs" ("Dialectics. Negation" 173). All other plants, animals, and people go through the same process of negation of the negation, regardless of how many times they produce seeds, eggs, or progeny before they pass away.

In mathematics, the law of negation of the negation also holds true. Engels affirms it: "Let us take any algebraic quantity we like: for example, a . If it is negated, we get $-a$ (minus a). If we negate that negation by multiplying $-a$ by $-a$, we get $+a^2$, i.e., the original positive quantity, but at a higher degree, raised to its second power" ("Dialectics. Negation" 174). The algebraic amount a becomes the original positive quantity with a higher degree, or a^2 when we negate it twice. It is identical to the amount we get by multiplying the positive a by itself.

Human history and the history of philosophy both exhibit the same process. There was a prehistoric communal society with shared ownership of the means of production. In the course of the development of agriculture, this common ownership turned into a constraint on productivity. The common ownership was negated and this gave birth to private property. However, as agricultural development advances, private property becomes a constraint and should once more be converted to communal property. But, this is not a return to the old, rudimentary common ownership; rather, it will be a more advanced common ownership using contemporary chemical discoveries and mechanical advancements (Engels "Dialectics. Negation" 176). The history of philosophy goes through a similar process of negation of the negation as does the evolution of human history.

The ancient school of thought was based on primordial, natural materialism, which was refuted by idealism. Modern materialism then refuted idealism. Instead of simply replacing primitive materialism, this modern materialism is a scientific materialism that has been enriched by the advancements in philosophy and natural science over the past two thousand years (Engels "Dialectics. Negation" 176-77).

The law of negation of the negation demonstrates that recurrence occurs during a thing's development. The advance, however, is what matters most when comparing the dialectical unity of advance and relative repetitiveness. A repetition may and often does come after multiple negations rather than just after two negations. Not all negations are completed, that is, not all of them represent transitions of their opposites; rather, most negations are partial since it takes multiple negations to transit to an opposite (Syusyukalov "Basic" 50). The basic shared ownership is only replicated after four negations in a socialist society. However, in accordance with the law of negation of the negation, repetition does not just mean replacing the old; rather, it refers to repetition at a level that is higher in both quantity and quality.

Conclusion

The article reveals that dialectical materialism views matter as a primary and mutable entity and there is the continuous movement of matter abided by its own inherent laws. The sole reality is the sensually observable world, and the human brain's reflection of this world is what gives rise to consciousness. The dialectical method considers motion or movement as a fundamental part of matter and sees all things as interconnected. In the material universe, everything undergoes change, and matter's motion is the main factor in all changes. The mobility of matter is not random; rather, it changes and evolves in accordance with its own rules. There are two contradictory aspects within a thing and the thing develops through the unity and struggle between these aspects. The unity between these aspects is relative and temporary but the struggle is absolute and permanent. The major driving force behind the growth of things is their internal contradictions, with external forces playing just a supporting role. The dialectical approach views an upward and forward movement of a thing and the thing develops through a series of quantitative and qualitative changes. There is an interrelationship between the quantitative and qualitative changes as the quantitative change leads a thing to its qualitative development and the new quality begins the new quantitative change leading to the new qualitative change. The thing develops from one qualitative stage to another negating the previous one and in the process of development of a thing, sometimes, repetition occurs but in this stage, the thing will be highly developed both in quality and quantity instead of a mere replacement of the old one. The article exposes some of these basic features of matter and the universal laws of motion of matter.

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