

Dialectical Method of G.W.F. Hegel and Karl Marx : A Comparative Analysis

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Abstract

This By revisiting the classical theories of G.W.F. Hegel and Karl Marx, this paper argues that their dialectics make a clear sense of knowing the external world and reality by solving some existing conflicts. We see in the ideas of Kant who separated logic from dialectic and made reality unknowable for us. Hegel's theory ensures the possibility of knowledge by showing the real world is only the external phenomenal form of 'the Idea'. But Marx's dialectic is more advanced and scientific for the new explanation of its basic principles that they use for social revolution, knowledge, and truth. Hegel's attempt to incorporate logic in dialectic is the rational kernel of Hegel's method that is borrowed by Marx. In Hegel's dialectic reality is characterized by inherent tendencies to develop the absolute idea. Dialectic is the Centre of reality and the world that can be understood only dialectically, this sort of idea we find in both Hegel and Marx's writings. Hegel's idea of sublation in dialectic is also very important for connecting our knowledge to the metaphysical world.

Keywords: Dialectics, Absolute, Sublation, Conflicts, Materialism, Idealism, Alienation, Self.

Methodology

The method I am using in this paper is comparative analysis. The comparative study consists in mutual supplementation of arguments and consequent clarification of issues. In this way, it helps to develop the intellectual atmosphere of philosophical heritage. The value of comparative study not only lies in simply detecting the similarities and cataloging the resemblances between two philosophical systems but also provide certain facts and arguments from one system to another in the growth of philosophy. It helps in tracing and clearing the way for a more comprehensive grasp of the truth from the sources.

Introduction

The word 'dialectic' is of ancient Greek origin initially meaning the ability to lead disputes and bring out the truth by disclosing contradictions in the arguments of opponents. This is also used as a method of cognizing reality and refers to the world as an endless process of movement, regeneration, and transformation of the old to the birth of new.

Socrates used dialogue as a dialectical method to search true knowledge that is different from Hegel and Marx's dialectics. For Kant, the dialectical process is inherent like reason. But transcendental idealism of Kant failed to explain the reality of the external world and it turned nature into a mere instrument or medium of moral action. Kant in his book '*Critique of Pure Reason*' formulated different antinomies without resolving this contradiction and failed to incorporate logic into the dialectic.

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Hegel's mystification of dialectic through his Absolute Idealism but he was the first to explore and develops systematically its logical form and movement.

Marx borrowed from Hegel's philosophy the basic concepts of dialectic and he interpreted it from the materialistic position and used it to develop dialectical and historical materialism. The philosophy of Marxism is based on dialectical materialism. It is materialism because it recognizes matter is primary and consciousness is secondary and examines the world as it is and it is dialectical because it examines the material world in constant motion, development, and reproduction.

The present paper will focus and analyze the dialectics of Hegel and Marx as well as Marx's critiques of Hegel's dialectic.

The discussion of the paper is arranged in the following way:

The paper is divided into the following sections-

1. What dialectic is
2. Hegel's conception of dialectic
 - 2.1 Hegel's critique of Kant
 - 2.2 Basic principles of dialectic
 - 2.3 Absolute idealism
3. Karl Marx's notion of dialectic
 - 3.1 Dialectical materialism
 - 3.2 Alienation
 - 3.3 New explanation of dialectical principles
4. Comparison and Contrast
 - 4.1 Critical analysis of Hegel's idealism to get the rational kernel of dialectics

Dialectical Method

The relation of consciousness to being is the fundamental question of philosophy because the answer to it determines the solution of all other philosophical problems like the unity of the world, the character of the laws governing its development, the essence of knowledge, and ways of cognizing the world, etc. The first problem is about what is primary matter or consciousness. The philosophers who maintain that matter is eternal, that no one had even created it, and that there is no supernatural force behind beyond the world are materialists. A philosopher who believes that the 'spirit' or 'consciousness' is the primary foundation of everything that exists is idealists. Objective idealist insists that the world is created by some kind of objective (supernatural or absolute) consciousness. The basic differences between Hegel and Marx concern this issue.

Hegel says, "All things ... meet their dooms and saying so, we have a perception that dialectic is the universal and irresistible power, before which nothing can stay, however secure and stable it may deem itself." (Hegel, 1807:85)

Volume 1 of *Capital* exposes Marx's most systematic application of his conception of dialectic. Marx's conception resembles Hegel's for the conception of the dialectical

method. Marx's dialectic is the study of contradiction in the essence of things that is, the internal force of matter. Hegel's dialectic is a self-developing of the concept. Hegel denotes a special theory or view of reality and used it to explain a special way or mode of seeing reality. However, Marx's dialectics is not a general theory about reality, but only a theory concerning social change. It is not an already existing view, which he uses or applies for analysis or explanation, but a view he puts forth for his inquiry, after analyzing a given type of society like capitalistic-industrial society.

Hegel evolved the basic laws of dialectics governing the development of ideas and thoughts. He showed that the development of ideas rose from lower to higher forms, that quantitative changes turned into qualitative ones in this process and that contradictions were the source of development. He characterized the basic concepts of dialectics and disclosed their interconnection and ability to turn each into another. It was this dialectic which Marx and Engels borrowed from Hegel's philosophy and which they interpreted from a materialistic perspective and used to develop dialectical and historical materialism.

But Hegel missed the historic-political potential of dialectic in transforming the real. Marx advanced the method beyond Hegel by insisting that contradictions are not done away peacefully through rational sublation in the act of thinking but through concrete struggle in the real world.

G.W.F. Hegel's dialectical method

Hegel's idealism was deeply rooted in Plato, Aristotle, and Spinoza's philosophy and he synthesized the concepts of Kantian and post Kantian idealism. His great work *Phenomenology of Spirit* and *Science of Logic* explains dialectic. He criticized Immanuel Kant's dialectic and argued that Kant wrongly dichotomized between form and content and thus leading to abstract philosophy that knows only appearances, not reality. Kant separated logic from dialectic and in his book *Critique of Pure Reason* he identified antinomies of reason but ignored the meeting of two contradictory concepts. The transcendental idealism of Kant explained nature as a mere instrument or medium of moral action and described the dualistic theory of knowledge predicated on the dichotomy of a knowing subject and its objects of consciousness. Hegel argued that the only way to ensure the possibility of knowledge was to take the objective idealist option and then Kant to reconstruct Kant's principle of subject-object identity.

Hegel evolved the basic laws of dialectic which govern the development of ideas and thought and then proceed towards upward from less to more perfect features. Two things are important for Hegel's dialectic such as

- (i) contradiction
- (ii) sublation

In Hegel's system, contradictions are merely intellectual contradictions. It is easily resolved by showing that they are just products of underlying concepts and logical sublation.

Hegel defined a moment as dialectical when "the universal ... of its own accord determines itself out of itself to be the other of itself"(Hegel,1812:831) the nature of

thinking is dialectic and finite things are inherently dialectical that we find from Hegel's dialectic. He explained three basic principles of dialectic:

1. The law of the unity and conflict of opposites
2. The law of passage of quantitative to qualitative changes
3. The law of the Negation of Negation

Three laws are ways of specifying how dialectical processes unfold in conceptual thought. In Hegel's method, the unity of opposites is dissolved in the ground. The positive passes to its negative. Social and rational development depends on the law of passage of quantitative to qualitative changes. The shift from an agricultural economy to an industrial economy is one such kind of change. This change occurs slowly and finally, it abolishes the old and establishes a new system. The negation of the negation is present in the development of the idea and thought. Hegel invested it with an idealist meaning.

Dialectic is a self-development concept as well. The absolute concept does not exist only as an eternal concept. It is also the actual living soul of the whole existing world. It develops into itself through all the preliminary stages which are included in logical principles. The limitations of Kant's transcendental dialectic are that he had no answer to the question of how pure concept relates to anything real; he had only the concept as a mere shadow.

But for Hegel, understanding, and reality are not abstract, reason makes the concrete relation in which concept or reality exists. Kant's idea of reason has limitations to overcome the antinomies. However, Hegel argued that reason can overcome understanding for knowing reality.

Hegel acknowledged the wholeness as 'Absolute'. All contradictions and conflicts are unified within this concept, that is, pure and truth also. So, in Hegel's dialectic, no conflict is not infinite rather finite as the primary and internal force of being.

In Hegel's method Being, Nothing, and becoming these three concepts are important. In his dialectic 'Being' begins with the consideration of pure being that is equal only to itself, 'Nothing' is the absence of all determination and content. Becoming is the unity of being and nothing.

In his book *The Phenomenology of Spirit*, an analysis of the development and shapes of spirit is given. The supreme notion is that of the Absolute as spirit. Spirit is that which has to be in itself, that which relates itself to itself, that which has "other-being" and being for self. He said as,

"The truth is the whole. But the whole is nothing other than the essence consummating itself through its development. Of the absolute it must be said that it is essentially a result, that only in the end is it what it truly is, and that precisely in this consists its nature, viz. to be actual subject, the spontaneous becoming of itself" (Hegel, 1807:13).

Hegel's "*Geist*" (spirit) refers to some sort of general consciousness, a single mind common to all men. The soul is that which underlines particular mental states and events, and the notion of *Geist* embodies the claim that all individuals share the same soul. Self-consciousness exists only in being acknowledged, it exists only for another.

His Philosophy of nature motivated to connect the systematic determination of nature to the theory of mind, to escape the dualist problems of connecting a disembodied spirit with nature. The Absolute is the 'I's self-reflection and self-determining activity, a transforming process, not a special kind of substance.(Hegel,1807:13)

The being of something as a something for consciousness, is knowledge. Hegel, at this stage, is trying to show that the criterion for the reality of an object is to be found in conscious experience. As Hegel puts it:

"Consciousness is, on the one hand, the consciousness of the object, on the other hand, the consciousness of itself, Consciousness of that which is for it the true and consciousness of its knowledge of this. In as much as both are there for the same consciousness, it is itself their comparison, it is a fact for consciousness whether its knowledge of the object corresponds to it or not." (Hegel,1807:56)

So, there is generally no longer any point in drawing any distinction between what the object is for us and the object as it is for itself. For him, the spirit is a kind of agent who desires knowledge and also freedom when the spirit will be the middle term between the idea and nature. Spirit requires subject-object distinction but also wants to overcome this distinction. So, we might reasonably suppose that 'Geist' (spirit) refers to some sort of consciousness apart from the particular manifestations of consciousness so that sense can be made of 'universal self' without denying the obvious fact that different people have different experiences, knowledge, and so on.

Karl Marx's ideas of dialectic

Dialectic, Engels wrote, is "the science of the general laws of motion and development of nature, human society and thought." (Engels,1878:172)

Marxist dialectic talks about constant movement, change, and development of matter and society. The Earth, the solar system, and everything is the product of the long development of matter. Dialectics is a process of change that Marx borrowed from Hegel but Marx's dialectics is different from Hegel's thought since this materialistic nature and endless process of conflicts is called 'dialectical materialism'. The basic laws of this dialectic gave a general picture of the development of the world, its cognition, and its transformation.

Three main sources are important for explaining Marxism. These are:

- a. German idealism from Immanuel Kant to Hegel;
- b. French revolution; and
- c. British political economy

German philosopher Immanuel Kant talked about the long evolutionary process of earth and the solar system, as well as the dialectic of antinomies of thought. This transcendental idealism is the primary source of Marx's dialectic. Marx followed Hegel who dealt the issue going beyond Kant's dualism of the thing-in-itself and the thing as it appears to the observer. Hegel refuted Kant's dualism of the knower and the known by arguing that necessity and universal categories do exist in the world. Reality and appearance exist in the world. Both Hegel and Marx saw history as being dialectical, starting dialectic with the concept. Hegel made natural history absurd. Marx's naturalistic starting and finishing points are opposite of Hegel's. Marx said

that for him it was not the concept but the material phenomenon which served as its starting point.

The Materialism of Ludwig Feuerbach (1804-1872) powerfully influenced the formation of Marx's and Engel's world outlook. Feuerbach who was a great materialist of his time rejected idealism and religion and supported matter as primary and consciousness as secondary. But he supported materialism as a mechanical view because he thinks that motion becomes to the matter by the mechanical way, not as internal forces such as hitting one billiard ball to another helps to go forward.

Marx rejected the political economist standpoint during His time. Adam Smith in his book *The Wealth of Nation* dealt 'theory of value' that said, product demand is determined by the supply of products that fix the price of the product. In the market economy when the product comes to the market, the concept of owner, labor, and interest makes conflicts. In this process, capitalist concepts emerge spontaneously. These ideas were criticized by Marxism. Likewise, David Ricardo another political economist who told about the 'Labor Theory of Value' in his book *The Principles of Political Economy*. He thought the price of a product is determined by the labor cost. When we fix the product's price then the conflicts among the labor, owner, and landlord will start. Marx called these struggles as class struggles. He wanted to abolish these struggles through the social revolution.

Marxists borrowed dialectical principles from Hegel but they explained it differently. First-principles explain as opposite of the internal sides, tendencies, forces of an object. These for us are mutually exclusive but at the same time presuppose each other. The severable interconnections of these sides composed the unity of opposites. For example, labor and owner of garments, induction, and deduction, etc. the conflicts of opposites all are an endless process, and thus these are the main source of development. This dialectic regarding motion as self-motion of matter, as internal motion, the driving forces or impulses are contained within the developing objects and phenomena themselves. Basic, non-basic, external, and internal contradictions all are important for the dialectical method.

Quantitative into qualitative changes is a universal law of development of the material world. Discontinuity or leap is a stage of radical qualitative change in an object, a moment, or period when old quality passes into a new one.

Negation is the internal part of the development of reality itself. By negating the previous mode of existence every new development will come. Negation is also inherent in the development of knowledge and science.

The theory of alienation was outlined by Marx in those of his works which were published in *German-French Yearbooks*, and it was extensively developed in *Economic and Philosophical Manuscripts of 1844*. Four features of the alienated life of the proletariat class that Marx showed in his book such as,

1. Alienation in the process of production
2. Alienation from the actual product
3. Social alienation
4. Species alienation

In *German Ideology*, he and Engels speak very critically about alienation, self-alienation, man's essence, human nature, so that it seems they come to reject the theory. In *German Ideology*, they maintain that philosophers in conceiving human history as the process of man's self-alienation transformed the whole of history into the process of the development of consciousness.

In the third volume of *Capital*, for example, Marx speaks about alienation and about the 'human nature' which ought to be realized in the future rationally organized society. We can consider a question like, what do alienation and self-alienation mean. It might be the case that man alienates something from himself or that he/she alienates himself from something. Some Marxist think that man alienates something from himself and they describe that man alienates the products of his/her material activity in the form of commodity and money. Man alienates the products of his/her spiritual activity in the form of religion, morals, etc. (G. Lukacks).

According to Marx, the essence of self-alienation is that man at the same time alienates something from himself and himself from something and he alienates himself from himself (Marx, 1932).

Marx begins with alienation in the process of production where labor is alienated from their labor. Products of their hands constitute a separate world of objects which is alien to him, which dominates him, and which enslaves him. The alienation of production means man alienates the products of his labor. After all, he alienates his labor activity, because his activity becomes for him an alien activity, an activity in which he does not affirm but denies himself, an activity which does not free but subjugates him.

Finally, as an immediate consequence of the alienation of man from himself, results in the alienation of man from another man. Every relationship in which a man stands to himself finds expression in his relation to another human. Thus the alienation of man from himself clears itself as the alienation of man from man. As the worker alienates the products of his labor, his activity, and his ethnic essence from himself, so he alienates another man as his master from himself.

In the capitalist society, labor produces merely what satisfy direct physical needs and becomes a slave through surrendering his or her labor power to another person. In this process, labor is alienated from the process and also from actual production. Labour does not know exactly about their production and cannot use their product. They do not feel production as their own and thus they are alienated and feel self-alienation too. The 'objectification of labor' in the capitalist society makes alienation of labor from the capital and mainstream economic class of the society which makes conflicts relation between capitalism and labor. In this process labor not only becomes an object but also an alienated object and an alienated force. For Marx, productive power is the main source of alienation. So to abolish the alienation process we need to change the social characteristics of the capital by changing personal capital to social capital or Socialism. So, Marx's dialectics is a method of the cognition and revolutionary transformation of society.

Critical analysis of Hegel's idealism to get the rational kernel of dialectics

Marx says,

"My dialectical logic is, in its foundations, not only different from the Hegelian but exactly opposite of it. For Hegel, the progress of thinking, which he event transforms into an independent subject, under the name of 'the idea', is the creator of the real world, and the real world is only the external appearance of the idea. With me the reverse is true: the ideal is nothing but the material world reflected in the mind of man, and translated into forms of thought..... The mystification which the dialectic suffers in Hegel's hands by no means prevents him from being the first to present its general forms of motion comprehensively and consciously. With him, it is standing on its head. It must be inverted to discover the rational kernel within the mystical shell." (Lanuza, 2016:103-133)

Marx was the only one who could undertake the work of extracting from Hegelian logic the core which included Hegel's real discoveries in this sphere, and to construct the dialectical method separated from its idealistic trappings in the simple shape in which it becomes the only true form of development of thought. Hegel's dialectical method started from the idea of motion, conflicts, the negation of the old and becoming the new but the process of thinking or 'the idea' he transforms into an independent subject, is the creator of the real world is only the external, phenomenal form of "the idea". The reflection of the material world on the human mind is the idea that translated into forms of thought.

Marx's critique of Hegel's philosophy of nature is most important. Hegel affirms nature as necessary for mediating the progress of consciousness. Marx thinks that nature must be before consciousness. Hegel, by making consciousness the starting point, set out from the separation of a nature that must finally be realized only in thought the progress of consciousness which he calls "the idea". For Marx (1973:101), Hegel conceives "the real as the product of thought concentrating, probing its depths and unfolding itself out of itself." In Marx's materialist account, by contrast, the theory has a more modest function, one that simply refashions in conceptual form claims and assumptions about an already existing reality. On his view, ideas are "nothing else than the material world reflected by the human mind and translated into forms of thought". (Marx, 1973:361).

Both Hegel and Marx viewed history as being dialectical, but by starting dialectical with the concept, Hegel made natural history absurd. Marx's naturalistic beginning and endpoints are the opposite of Hegel's. Marx said that for him it is not the concept but the material phenomenon can serve as its starting point. In Hegel's Idealism thought and being are linked through a process wherein reality is granted out of thought itself.

The logical method is the rational kernel of Hegel's method. In Hegel's dialectics reality is characterized by inherent tendencies to develop. Dialectic is the heart of reality and the world can only be understood dialectically this kind of idea which we find in both Hegel and Marx's method. Hegel's idea of nature itself contains consciousness but in Marx's dialectic, consciousness itself is a product and reflection of nature. Hegel's dialectic was used in Marx's method by turning it into an empirical method and the endless process of becoming.

Finally, we can say that the dialectical method is the most important method to get true knowledge searched by philosophers. I could say that Hegel is the first philosopher who made the method of dialectic more philosophical. He explains contradiction but logical sublation can solve all contradiction within the realism of absolute idea. Hegel thought that as, the life process of the human brain, the process of thinking is under idea and the real world is only the external phenomenal expression of the idea. That is why it is called the mystification of dialectic. Marx developed its basic principles that can explain social change and knowledge more systematically. Although Marx claimed that his dialectic is the opposite of Hegel yet he borrowed the logical form of dialectic from Hegel. Marx concluded that philosophers have only interpreted the world in various ways but the point is to change it, after a long struggle with Hegel's pure idealistic dialectic in which Reason becomes the ground of its logical analysis. Marx, unlike Hegel, saw the revolutionary potential of dialectic. It is negative. It refuses to compromise with what is (Williams, 1989). Marx thought that Hegel's contradictions are not done peacefully through rational sublation in the act of thinking; it has continued through concrete struggle in the real world. This is the basis of Marx's rejection of the position of political economists during his time. Marx criticized the political economists for equating capitalism with what is natural and eternal. Capitalism contains its seed of destruction. But Marx is not simply claiming that he has a moral critique of capitalism. He shows that capitalism itself contains its seed of destruction that will lead it to a new social and economic formation.

Karl Marx's materialist dialectic 'turns Hegel on his head' by insisting that the starting point for accurate historic-economic understanding should not be the dynamics of the Mind, but rather through the social and material relations through which individuals and their societies maintain coherence and organize their way of life (Buchwalter, 2012).

Engels made the point that 'three laws' of dialectic, the 'unity of opposites', the 'transformation of quantity into quality,' and the 'negation of the negation' can explain reality from Hegel's work. But Engels did not cast these dialectical laws as metaphysical truths that can be applied universally. For Hegel, these are ways of specifying how dialectical processes unfold in conceptual thought. Marx, especially Engels, adopted these basic analytical tools of Hegel's dialectic, but they did not assume that these three fundamental laws of Hegel's logic capture or exhaust every dialectical process at work in the world. Contradictions in Hegel are merely intellectual contradictions to be resolved by merely intellectual methods or in the words of Marx, "a divine dialectic... the pure products of the labor of thought living and moving within itself and never looking out into reality"(Rees, 1998:63).

In Hegel, contradictions are easily resolved by showing they are just products of underlying concepts and logical sublation. His greatest work the '*Phenomenology of Spirit*' defies categorization and analyzes the development and shapes of spirit. He did not make any distinction between mind and self and he considered the mind as an illusion. He also tries to overcome the Kantian dualism. Hegel did not believe in any final category and though we always make a new category. So for him, the reality is always dynamic.

Marx, Engels, and Lenin believed that dialectic works in history and the world. This is not a purely academic or intellectual assertion but grounded in the belief that we need to understand the world to change it. Understanding the world leads necessarily to practice as a way of transforming it. Dialectic is not just about the contradictory nature of the world but of using this knowledge to change it.

Despite the fundamental opposition between the materialist standpoint of Marxism and the idealism of Hegel, these two schools of thought have one extremely important element in common: their logical method. This is the rational kernel of Hegel's method. Allen Wood (2004) summarizes Marx's rejection of Hegel's dialectic is his vision of reality as structured organically and characterized by inherent tendencies to development. The 'mystical shell' is Hegel's logical pantheistic metaphysics, which represents the dialectical structure of reality as a consequence of the thinking spirit's creative activity. Marx's 'inversion' of Hegel consists in viewing the dialectical structure of thought not as a cause or explanation for the dialectical structure of reality, but merely as a consequence of the fact that it is thought's function to mirror a dialectically structured world.

Marxism as a theoretical guideline, not a set of fixed doctrines, still demarcates the horizon of our everyday life. This comparative discussion of their method helps us to know the real nature of dialectic which would help us in our endeavor for having new knowledge.

Bibliography

- Buchwaiter, A. (2012). *Dialectics, politics, and the contemporary value of Hegel's practical philosophy*. New York: Routledge publisher.
- Boger, G. (1999) On the Materialist Appropriation of Hegel's Dialectical Method. (pp. 26-59) *Science and Society*, vol.55, no.1, Springer.
- Engels, F. (1878) *Anti-Duhring*. (Burns, E. Trans.) Progress Publishers, 1947.
- Hegel, G.W.F.(1807) *Phenomenology of Spirit*.(wurzburg, B.Geobhardt, J. A. Trans) terry pinkard, 2010.
- Hegel, G.W.F. (1812) *Science of Logic*.(Digiovanni, G. Trans.) Cambridge University Press, 2010.
- Kant, I. (1881). *Critique of Pure Reason*.(Muller F. M. Trans.) London: Macmillan and Co.
- Lanuza, G. M. (2016) The Dialectical Foundations of Marx's Sociology of Conflict: Methodological Implications for the study of Conflicts. (pp. 103-133) *Philippine Sociological Review*, vol.64, special issue; sociology of peace and conflict.
- Marx, K. (1867) *Capital*, vol-1, fingerprint classics publisher, 2016.
- Marx, K. (1932) *Economic and Philosophic Manuscripts of 1844*.(Milligan M. Trans.)Dover Publications, INC.
- Marx, K. (1973) *Grundrisse: Foundations of the Critique of Political Economy*. (Nicolaus M. Trans.) New York: Random House.
- Mepham, J. and Ruben, David-Hillel(1979) *Issues in Marxist Philosophy*. The Harvester Press.
- Mccarthy, G. (2019) Development of the Concept and Method of Critique in Kant, Hegel, and Marx. (pp. 15-38) *Studies in Soviet Thought*, vol. 30, No.1, Springer.
- Rees, J. (1998) *The Algebra of Revolution: The Dialectic and the Classical Marxist Tradition*. London: Routledge publishers.
- Speight, A. (2008) *The Philosophy of Hegel*. Acumen publishing limited, Stocks field.
- Selsam, H. and Martel, H. (1967) *Reader in Marxist Philosophy (from the writings of Marx, Engels, and Lenin)*. New York International Publishers.
- Stanley, J. L. (1997) Marx Critique of Hegel's Philosophy of Nature. (pp. 449-473) *Science and Society*, vol. 61, No.4, winter 1997.
- Williams, H. (1989) *Hegel, Heraclitus, and Marx's Dialectic*. Hemet Hempstead: Harvester Wheatsheaf.