41, 42 : You cannot step twice into the same rivers; for fresh waters are ever flowing in upon you.

43 : Homer was wrong in saying : "Would that strife might perish from among gods and men !" He did not see that he was praying for the destruction of the universe; for, if his prayer were heard, all things would pass away.

44 : War is the father of all and the king of all; and some he has made gods and some men, some bond and some free.

46 : It is the opposite which is good for us.

50 : The straight and the crooked path of the fuller's comb is one and the same.

51 : The sea is the purest and the impurest water. Fish can drink it and it is good for them; to men it is undrikable and destructive.

57 : Good and evil are one.

59 : Couples are things whole and not whole, what is drawn together and what is drawn asunder, the harmonious and the discordant. The one is made up of all things, and all things issue from the one.

60 : Men would not have known the name of justice if these things were not (injustices).

62 : We must know that war is common to all and strife is justice, and that all things come into being and pass away through strife.

67 : Mortals are immortals and immortals are mortals, the one living the other's death and dying the other's life.

69 : The Way Up and the Way Down is one and the same.

70 : In the circumference of a circle the beginning and the end are common.

78 : And it is the same thing in us that is alive and dead, awake and asleep, young and old; the former are shifted and become the latter, and the latter in turn are shifted and become the former.

81 : We step and we do not step into the same rivers; we are and we are not.

104 : It is not good for men to get all they wish to get. It is sickness that makes health pleasant; evil, good; hunger plenty; weariness, rest. (44)

This is the world in which we mortals live : a world that is constructed of conflicting elements, a world that changes before we can have two successive thoughts about it. It is a world without stability. At the same time, the conflict and the consequent mobility are necessary for its very existence. Homer was wrong in saying 'Would that strife might perish from among the gods and men.'

In the Marxist doctrine, which is based upon the Hegelian notion of dialectical movement, conflict is extalted as the cause of all progress. At the root of this strife is negation or privation --- the intrinsic principle of fecundity that is present throughout Nature, since matter is itself self-contradictory. To do away with strife would be the same as to do away with our universe, since all diversity, all perfection, according to the Marxists comes about through conflict.

What is generally considered to be the essential part of Heraclitean teaching, that which makes it the antinomy of Parmenidean doctrine, is the notion of conflict and becoming. If this were the only element in Heraclitus, then the Marxists, indeed, could rightfully claim a certain continuity with his philosophy. But there is another element, Heraclitus's teaching on the One which is more important, more essential than the doctrine of becoming. For, as we shall see, Heraclitus calls the knowledge of the One Wisdom, while our knowledge of the changing world is subject to error. Consequently, the continuity

between the philosophy of Heraclitus and that of the Marxists is not verified, except in an accidental manner.

The fragments that follow are those concerning the nature of the One or to the knowledge of the One.

Diogenes Laertius : IX, 7-11 :
All things are composed of Fire and dissolve into Fire; all things come to be in accordance with Destiny and all that exists is bound together by that which runs in opposite directions; and all things are full of Psychai and daimons... You cannot discover the limits of Psyche, though you journey over every way : so deep is its cause (logos). (45) Hack, p. 70.

Sextus Empiricus, VII, 127 :
That which contains us in endowed with reason (logos) and with intelligence. According to Heraclitus, this divine Reason we draw in when we breathe, and become endowed with mind; and when we are asleep we are forgetful, but on waking are again rational. For during sleep, since the passages of the senses are closed, the mind in us is separated from its union with that which contains us...Heraclitus asserts that this common and divine Reason, by partaking in which we become endowed with Reason, is the criterion of truth. (46) Hack, p. 74.

Fragments enumerated by Bywater, and given in Burnet's Early Greek Philosophy :

1 : It is wise to hearken not to me but to my word, and to confess that all things are one.
(Another translation of this fragment : It is wise to hear not me but the Ordinance, and to agree that the One knows all things).

2 : Though this Word (logos) is true evermore, yet men are as unable to understand it when they hear it for the first time as before they have heard it at all. For, though all things come to pass in accordance with this Word, men seem as if they had no experience of them, then they make trial of words and deeds such as I set forth, dividiing each thing according to its kind and showing how it truly is.

16 : The learning of many things teach the not understanding, else it would have taught Hesiod and Pythagoras, and again Xenophanes and Hekataios.

17 : Pythagoras, son of Mnesarchos, practiced scientific inquiry beyond all other men, and making selection of these writings, claimed for his own wisdom, what was but a knowledge of many things.

18 : Of all whose discourses I have heard, there is not one who attains to understanding that wisdom is apart from all.

19 : Wisdom is one thing. It is to know the thought by which all things are steered through all things.

20 : This world (Κόσμος) which is the same for all, no one of gods or men has made ; but it was ever, is now, and evee shall be an ever-living Fire, with measures of it kindling and measures going out.

26 : Fire in its advance will judge and convict all things.

28 : It is the thunderbolt that steers the course of all things.

49 : Men that love wisdom must be acquainted with many things indeed.

61 : To God all things are fair and good and right, but men hold some things wrong and some right.

65 : The wise is only one.

70 : In the circumference of a circle the beginning and end are common.

71 : You will not find the boundaries of soul by travelling in any direction, so deep is the measure of it.

91a) Thought is common to all.

91b) Those who speak with understanding must hold fast to what is common to all as a city holds fast to its law, and even more strongly. For all human laws are fed by the one Divine Law. For the Divine Law extends its power as far as it pleases.

96 : The way of man has no wisdom, but that of God has.

98-99 : The wisest man is an ape compared to God, just as the most beautiful ape is ugly compared to man. (47)

We have in these passages two things to point out : the multitude of the different titles he bestows upon the supreme God; and the knowledge of this One, which is Wisdom.

Heraclitus calls the supreme God Fire, the One, Psyche (Life or Soul), That which contains (το περιέχον), the common Reason (λογος), the one Law (νόμος), Destiny, Lightning, the Way Up and the Way Down. Each of these titles corresponds to the various aspects of the Divinity that makes all things One.

If we understand Heraclitus ' purpose, we shall have a key to what seems to be a contradiction : a supreme God who is one yet is many. Heraclitus doctrine is a reaction to that of Xenophanes and Pythagoras, who had separated God from the universe of men and animals and plants and inanimate things, that is the world of πάντα ῥεῖ . Against the separation of the supreme God from the changing many, Heraclitus reaffirmed the identity of the supreme God with all that is. Against Pythagoras he argued that the One Fire was itself all the changing opposites and was not merely present, in some mysterious fashion, in all things.

How could Fire change and yet retain the perfection of the Divinity ? Heraclitus tried to solve this difficulty by his doctrine of recurring Fire. As Hack says, "this might be called the doctrine of Identity by repetition." (48) Heraclitus says : "The universe is begotten from Fire and again turns into Fire in alternating

cycles through all eternity; and this takes place in accordance with Destiny". (49) Anaximander had already taught that infinite universes are born and perish again in infinite succession; and Axanimenes followed this direction of his master, Heraclitus, seeing in this a solution for the difficulty of the One and the many.

Heraclitus fixed the intervals at which the all consuming Fire recpatured its perfect unity by overcoming all change and diversity. This interval was fixed at 10, 800 years and it was called the Great Year. Heraclitus considered thirty years to be one generation and this multiplied by the number of days in a solar year (360 for him) is equal to the above figure. During this Great Year the recurring Fire blots out all changes and shows that they were essentially an illusion. Thus through repetition is attained an identity that preserves the perfection of the supreme God. The same operation is performed for time : the endless torrent of time is arrested and disappears into the sands of eternity.

There is a passage in Engel's Dialectics of Nature remarkably similar to this.

> Matter moves in an eternal cycle completing its trajectory in which a period so as that in comparison with our earthly year is as nothing; in a cycle in which the period of highest development, namely the period of organic life with its crowning achievement self-consciousness, is a space just as comparatively minute in the history of life and of self-consciousness; in a cycle in which every particular form of the existence of matter --- be it the sun or a nebula, a particular animal or

> animal species, a chemical combination or decomposition --- is equally in transition; in a cycle in which nothing is eternal, except eternally changing, eternally moving matter and the laws of its movement and change. But however often and pitilessly this cycle may be accomplished in time and space, however many countless suns and earths may arise and fall, however long it may be necessary to wait until in some solar system, on some planet appear conditions suitable for organic life, however many countless beings may fall and rise before, out of their midt, develop animals with a thinking brain that find an environment that permits them to live, be it even only for a short period, we are, nevertheless, assured that matter in all its changes remains eternally one and the same, that not one of its attributes may perish, and that some iron necessity which compels the destruction of the highest earthly bloom of matter --- the thinking spirit --- also necessitates its rebirth at some other place, at some other time. (50) Dialectics of Nature, p. 125.

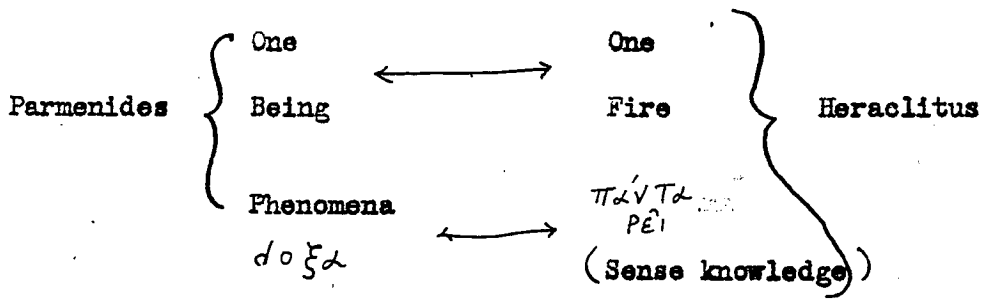
One essential difference between these two doctrines, however (and we must point it out immediately) is that in the system of Heraclitus Mind is prior to the movement of the Fire, for it is Reason directing all that comes about. In the Marxist doctrine, on the other hand, Mind comes to be as the result of the blind and necessary movement of matter. The presence of Finality in the one, and the absence of it in the other, make all the difference in the world. What is important in the doctrine of Heraclitus is not that Fire is something material, comparable to matter, which Marxists say is the reality of which all things are made. Fire must not be looked upon so much from the viewpoint of material causality (to express this notion in Aristotelian terminology --- though this is not excluded), but rather from the aspect of final causality, for Fire is the Ratio, the Logos that is present in all things. Fire is the Intellect that directs all. When we consider that matter in the Marxist philosophy is a blind force,

without direction, without intelligence, we see that there cannot be any essential continuity between this and the philosophy that teaches the necessity of a Mind directing the whole of Nature.

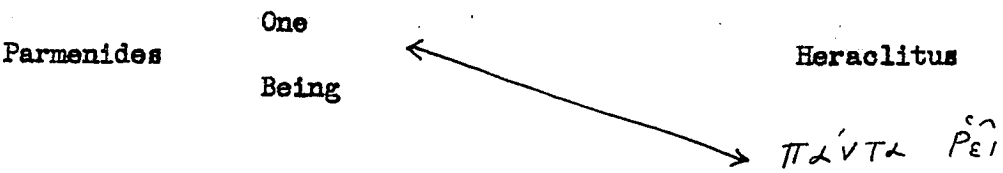
In God in Greek Philosophy Hack points out the paradoxical content of Heraclitus doctrine. Instead of being the philosopher of change, he is essentially a monist, for the πάντα ῥεῖ is but a means for bringing out the attributes of the supreme God who is one.

> And yet it has been the fate of Heraclitus, who invented this almost magical artifice for the abolition of real time and real change, to be abused and admired as the philosopher of the "flux". Heraclitus invented the doctrine of the flux, that πάντα ῥεῖ, for a different but wholly consistent purpose, as we have already seen; it was intended to reunite the supreme god with the changing world, from which Xenophanes had separated his One God.
>
> The doctrine of Recurrent Fire also contributed to solve the problem of causality and impure body. If at regular intervals nothing remained except pure Fire, the most subtle and causal of all substances, it seemed to Heraclitus that he had released the supreme god from the impurity and the passivity of body. Therefore Heraclitus did not hesitate to emphasize the comparative baseness of earth and water. He referred to the Path on which they were formed as the Path Down, and as Deficiency or Want....
>
> The philosophy of Xenophanes had induced Heraclitus to go far on the road that ultimately led to the complete distinction between the Aristotelian God (immaterial Reality) and matter ("material" unreality). The supreme god of Heraclitus was still spoken of as changing, but Fire had assumed the dignity of the cause and the agent of change, and its activity was necessarily contrasted with the passivity of that which it caused. But that which is caused by Fire is the lower forms of Fire; and these lower forms take on a degree of relative passivity and unreality which corresponds to their lowly stations in the temporal universe. They become mere intervals in the one active divine reality of Fire. God is the eternal cause, and all change is temporal (51)

Heraclitus was very critical of those who thought that in the knowledge of the many they had wisdom. Wisdom is rather the knowledge of the One. "The learning of many things teaches not wisdom". And "Wisdom is one thing. It is to know the thought by which all things are steered through all things". Thus we have in Heraclitus a great similarity with the doctrine of Parmenides. Each has a world of change which cannot give the certain knowledge that is an attribute of Wisdom; each has the One which does not change in itself but is eternal and necessary. Wisdom consists in seeing all in this one. In comparing Heraclitus and Parmenides, therefore, we should take both these aspects into consideration. The comparison will then be made in the following way :



And not in this way :



The method of limits gives us an excellent means to understand Heraclitus just as it helped us to understand Parmen-

ides. The doctrine of the recurring Fire is, as Hack put it, "the doctrine of identity through repetition." We can consider the Fire as the 1 that is in eternal movement towards 2. This 2 is the ideal limit --- it is that point at which real diversity would be had, if the movement from 1 ever reached there. The One, the Fire tends towards otherness in a movement that is eternal, but at definite cycles there is a return to Itself, and it sees that it has not really gotten away from itself; it has not really become anything different; it realizes that its attempt to make 2 which is otherness, is but an ideal, a logical attempt. There can never be anything but Fire.

The most fundamental tendancy of modern logical mathematics is the attempt to create multiplicity out of identity. The intellect by using its native power of construction — by repeating an act properly its own — tends to bridge the difference between two things that are formally different. If per impossibile the limit could be reached, the gap would be perfectly breached and there would be perfect identity of two formally distinct concepts.

The power that the intellect uses is its ability to construct relations of identity. For example, in the predication A is A the intellect recognizes the identity of subject and predicate. But the intellect can continue its judgements. It can know each following act as well as the first. Intelligit se intelligere, etc. Nothing new is added from the outside, but all diversity comes

from the intellect itself. The diversity consists in the new reflection of the intellect according to a certain order, in which order the mind sees its former judgments and knows that in spite of the different acts there is a fundamental unity.

It is not sufficient to have mere repetition. There must be order. And the mind must see this order and know that it is constructing a continuum. In the infinite series that proceeds from 1 to 2 the mind sees that in each successive division by two it is constructing an order, yet it realizes that it is still within the limits of 1, and will eternally remain there. But because of the diversity of each suceeding division the intellect has the impression of constructing the entire distance from 1 to 2.

The possibility of the infinite movement comes about because the intellect does not depend on any new experience, but has all that it needs within itself to create this diversity. All that it needs to start off is the one simple concept. The intellect takes over from there and with its native power constructs all the diversity that comes into the successive judgements. It need not rely again on experience because the relationships that are set up are not real or predicamental but are relations of reason only.

> Ex hoc autem ulterius concludit, quod identitas est unitas vel unio; aut ex eo quod illa quae dicuntur idem, sunt plura secundum esse, et tamen dicuntur idem in quantum in aliquo uno conveniunt. Aut quia sunt unum secundum esse, sed intellectus utitur eo ut pluribus ad hoc quod relationem intelligat. Nam non potest in-

telligi relatio nisi inter duo extrema. Sicut cum dicitur aliquid esse idem sibi ipsi. Tunc enim intellectus utitur eo quod est unum secundum rem, ut duobus. Alias ejusdem ad seipsum relationem designare non posset. Unde patet, quod si relatio semper requirit duo extrema, et in huiusmodi relationibus non sunt duo extrema, secundum rem, sed secundum intellectum solum, relatio identitatis non erit relatio realis, sed rationis tantum, secundum quod aliquid dicitur idem simpliciter. Secus autem est, quando aliqua duo dicuntur esse idem vel genere vel specie. Si enim identitatis relatio esse res aliqua praeter illud quod dicitur idem, res etiam, quae relatio est, cum sit idem sibi, pari ratione haberet aliam relationem, quae sibi esset idem, et sic in infinitum. Non est autem possibile in rebus in infinitum procedere. Sed in his quae sunt secundum intellectum nihil prohibet. Nam cum intellectus reflectatur super suum actum, intelligunt se intelligere. Et hoc ipsum potest etiam intelligere, et sic in infinitum. (52) St. Thom. in Meta. V, lesson XI, no. 912

The eternal movement of the Fire in Heraclitus is like the movement of the intellect which takes one simple concept and tries to create otherness out of it. Heraclitus, however, realizes the tentative character of this movement ; he knows that in spite of what the senses tell him about change and diversity, there are nothing other but manifestations of the one, eternal Fire "that judges all." Thus Fire, though ever moving along the Way Down, is at the same time always coming back to itself at definite cycles, and therein it sees that what men judge to be diversity is nothing else than Fire. Thus does Fire swallow up diversity, and eternity swallow up time.

Heraclitus has been invoked as the father of pluralistic philosophy, because all the emphasis has been put on one side of his doctrine. The most important element in his philosophy, however, according to Heraclitus himself is the doctrine of the One. It is the

doctrine of the Fire, of the Logos that is present in all things, that directs all things. Fire judges all diversity and finds that diversity of this world is but a movement towards separation from the one Fire, a movement that will never reach otherness, just as a polygon will never become a circle, just as one will never become two.

Wisdom for Heraclitus is the knowledge that the diversity has its origin in the x One and is nothing other really than the One. Wisdom is seeing the relationship of origin of the many in the one, most universal cause. That is why a man is not wise merely because he knows many things --- he must see the many in the One in their order of procession.

This definition of wisdom sounds so much like the Aristotelian definition that they might appear to be essentially the same. The best treatment of wisdom in Aristotle is found in the first book of the Metaphysics together with the commentary of Saint Thomas.

It is the function of wisdom to order. Now the man who is best fitted to order and direct others is the one who is the most intelligent. Likewise the science that is to direct other sciences and other knowledge should be that which is the most intellectual. The science which is the most intellectual is that which is a) most certain; b) most universal; c) most removed from the principle of variability, that is, matter. Wisdom, consequently, is knowledge through causes (for this is the most certain) of objects that are most universal and

most necessary.

Omnes autem scientiae et artes ordinantur in unum, scilicet ad hominis perfectionem, quae est ejus beatitudo. Unde necesse est quod una earum sit aliarum omnium rectrix, quae nomen sapientiae recte vindicat. Nam sapientis est alios ordinare.

Quae autem sit haec scientia, et circa qualia, considerari potest, si diligenter respiciatur quomodo est aliquis idoneus ad regendum. Sicut enim, ut in libro praedicto Philosophus, dicit, homines intellectu vigentes, naturaliter aliorum rectores et domini sunt : homines vero qui sunt robusti corpore, intellectu vero deficientes, sunt naturaliter servi : ita scientia debet esse naturaliter aliarum regulatrix, quae maxime intellectualis est. Haec autem est quae circa maxime intelligibilia versatur.

Maxime autem intelligibilia tripliciter accipere possumus. Primo quidem ex ordine intelligendi. Nam ex quibus intellectus certitudinem accipit, videntur esse intelligibilia magis. Unde cum certitudo scientiae per intellectum acquiratur ex causis, causarum cognitio maxime intellectualis esse videtur. Unde et illa scientia quae primas causas considerat, videtur esse maxime aliarum regulatrix.

Secundo ex comparatione intellectus ad sensum. Nam, cum sensus sit cognitio particularium, intellectus per hoc ab ipso differre videtur, quod universalis comprehendit. Unde et illa scientia maxime est intellectualis, quae circa principia maxime universalia versatur. Quae quidem sunt ens, et ea quae consequuntur ens, ut unum et multa, potentia et actus. Huiusmodi autem non debent omnino indeterminata remanere, cum sine his completa cognitio de his, quae sunt propria alicui generi vel speciei, haberi non possit. Nec iterum in una aliqua particulari scientia tractari debent quia cum his unumquodque genus entium ad sui cognitionem indigeat, pari ratione in qualibet particulari scientia tractarentur. Unde restat quod in una communa scientia huiusmodi tractentur; quae cum maxime intellectualis sit, est aliarum regulatrix.

Tertio ex ipsa cognitione intellectus. Nam unaquaeque res ex hoc ipso vim intellectivam habeat, quod est a materia immunis, oportet illa esse maxime intelligibilia, quae sunt maxime a materia separata. Intelligibile enim et intellectum oportet proportionata esse, et unius generis, cum intellectus et intelligibile in actu sint unum. Ea vero sunt maxime a materia se-

> parata, quae non tantum a materia signata abstrahunt, "sicut formae naturales in universali acceptae, de quibus tractat scientia naturalis" sed omnino a materia sensibili. Et non solum secundum rationem, sicut mathematica, sed etiam secundum esse, sicut Deus et intelligentiae. Unde scientia, quae de istis rebus considerat, maxime videtur esse intellectualis, et aliarum princeps sive domina. (53) St. Thomas, Prooemium ad Meta.

The person who best knows the causes, the reasons, for something is best able to direct. And his knowledge is the more certain the more profound is his knowledge of the causes that enter into play in the object of his knowledge. Relating this to Heraclitus it would mean that the knowledge that the Fire is the Source and the End of all diversity in the universe is truly wisdom.

Secondly, wisdom is characterized by universal knowledge as contrasted with the knowledge of singulars. It is the function of the senses to know singulars. Everything that our senses come into contact with in the universe is a singular. Heraclitus says that the knowledge of many things is not wisdom, but rather the knowledge of the One that permeates all things. Heraclitus has a disdain for those who regulate their lives according to the knowledge of the senses alone : first of all, because the senses deceive; and secondly, because they give us only one side of the picture, the diversity, and tell us nothing of the fundamental sameness that underlies all.

Thirdly, wisdom has as its object that which is most removed from the principle of variability which is matter.

Consequently, when there is a complete separation from matter, we have an object that is invariable in itself, is necessary, is eternal. Wisdom in the philosophy of Heraclitus looks away from the changing universe to the Fire, which is Eternal and Necessary and always the same in itself. Heraclitus did not explicitly mention matter as the principle of mutability, but he did contrast the Fire which is light and ethereal with that which is heavy, like earth and water. When Fire is united to these latter it is on the Way Down; when it leaves these in its Way Up, it regains its original perfection.

Marxists consider matter to be at the root of all things, even of the perfection called Mind. There is only one thing in the whole universe that remains fixed and eternal --- it is matter. Heraclitus looked upon matter as the antithesis of Fire. When Fire became united to matter, it was on the Way Down; it was in the process of losing those attributes which belong to perfect Being. Heraclitus considers matter to be the destruction of Mind rather than its underlying principle. This is but another point in which the apparent continuity of dialectical materialism with Heraclitean philosophy is shown to be but an illusion.

In Heraclitus we have already a real advance towards the notion of Wisdom. Because of his imperfect understanding of the analogy of Being, however, the doctrine of Heraclitus might appear to approach more closely to the attempts of modern logico-

mathematicians to reduce all diversity to homogeneity.

In our study of the method of limits when applied to Parmenides and Heraclitus, we saw that the mind attempted to bridge the gap between two concepts that are formally distinct, Thus the mind tried to create, by its native power, the 2 from the 1; likewise it tried to make the circle with only a polygon as its working material. Now wisdom will consist, for the Hegelian and for the modern logico-mathematician in reducing the numerous formally distinct concepts to one concept, with the purpose of seeing that which is distinct in that which is but one. This attempt is brought out very clearly in the attempt by Meyerson to reduce science to unity.

> L'idée centrale d'Emile Meyerson semble avoir toujours été la suivante : notre raison ne croit vraiment avoir compris un fait que si elle parvient à montrer comment ce fait était déjà contenu implicitement dans les faits antérieurs, à l'identifier en quelque sorte avec du déjà donné, préexistant à ce fait. De là vient pour lui l'importance dans toutes les branches de la science de la constatation des permanences; de là le rôle essentiel des principes de conservation dans les théories physiques et chimiques. Mais, en montrant cette tendance instinctive de notre raison, le grand philosophe en soulignait hardiment le caractère paradoxal, car l'effet identificateur de la raison, s'il pouvait complètement réussir, aboutirait à l'abolition de toute diversité et de toute hétérogénéité, c'est-à-dire à une espèce de négation de monde même qu'il cherche à expliquer. Et si la raison parvient néanmoins à s'échapper de ce cercle vicieux et à constituer une science qui incontestablement progresse, c'est, pense-t-il, qu'elle laisse se glisser dans nos constructions théoriques quelques éléments irrationels dont l'introduction plus ou moins subreptice permet à l'ensemble de nos identifications successives de ne pas constituer seulement une immense tuatologie, Comme toutes les doctrines philosophiques de cette envergure la doctrine de Meyerson a été et sera discutée. (54)

There is a twofold reduction to unity in our science. The one is true wisdom, but the other is not. The reduction to unity through homogeneity is not wisdom, for this is a reduction to the universale in praedicando. It is true that this is most certain knowledge for us. But it is such because it is knowledge that is most in keeping with the potential character of our intellect. It is most certain because it is the least determined in itself. As Saint Thomas said in the preface to the Metaphysics, our knowledge cannot rest with those most universal metaphysical principles but it must continue and work out the particular sciences. The knowledge of those most universal metaphysical principles, where there is homogeneity because there is potentiality, is as Meyerson says knowledge that is but an "immense tautology".

In the reduction of the formally distinct concepts does not reach this homogeneity, then the only thing that is left is an evident contradiction. We have to say that one is the same as two; that polygon is the same as circle; that movement is the same as rest; that spirit is the same as matter. And this is the choice that Marxists make when faced with the dilemma.

True wisdom, on the other hand, is seeing the many in the light of the One. But here the One is taken as the Universale in causando. Wisdom is not mere homogeneity. Wisdom presupposes a knowledge of the diversity of things --- that is why wisdom presupposes the analogy of being. Wisdom is the knowledge of what is most actual

rather than of what is most potential. It is knowledge of what is most intelligible in se, consequently of what has the most perfect Form, since knowability comes by reason of the form. Wisdom is the knowledge of the One God Who is distinct from all other beings, the knowledge of the God who is like other beings in Nature by the tiniest bond of analogy of Being.

Wisdom does not do away with diversity, but it understands diversity more perfectly because it sees it in its Universal Cause. When individuals are seen in relationship to their Origin they are understood more perfectly in themselves, because their order of procession is a characteristic that attaches itself to each individually. This order is not seen when things are recognized only in their plurality.

When the philosopher tries to reach wisdom by reducing all to homogeneity he is substituting what is most imperfect for what is most perfect, what is most knowable for us as human beings for what is most knowable in itself. It is the reduction of the science that is most difficult to that which is easiest.

The following passages from Saint Thomas bring out the distinctions that must be made about certitude and intelligibility:

> Istae igitur sunt tales opiniones, quas homines accipiunt de sapientia et sapiente. Ex quibus omnibus potest quaedam sapientiae descriptio formari: ut ille sapiens dicatur, qui scit omnia etiam difficilia per certitudinem et

causam, ipsum scire propter se quaerens, alio ordinans et persuadens. (55) in Meta. I, no. 43.

Ostendit quod omnia praedicta conveniunt ei qui cognoscit primas causas et universales; et eo ordine prosequitur quo supra posuit. Unde primo posuit quod habenti scientiam universalem maxime insit omnia scire; quod erat primum. Quod sic patet. Quicumque enim scit universalia, aliquo modo scit ea quae sunt subjecta universalibus, quia scit ea in illa; sed his quae sunt maxime universalia sunt omnia subjecta, ergo ille qui scit maxime universalia, scit quodammodo omnia.
(56) Ibid. no. 44.

Ostendit eidem inesse secundum, tali ratione. Illa quae sunt maxime a sensibilibus remota, difficilia sunt hominibus ad cognoscendum; nam sensitiva cognitio est omnibus communis, cum ex ea omnis humana cognitio initum sumat. Sed illa quae sunt maxime universalia, sunt sensibilibus remotissima, eo quod sensus singularium sunt : ergo universalia sunt difficillima hominibus ad cognoscendum. Et sic patet quod illa scientia est difficillima, quae est maxime de universalibus.
(57) Ibid. no. 45.

Sed contra hoc videtur esse quod habetur primo Physicorum. Ibi enim dicitur quod magis universalia sunt nobis primo nota. Illa autem quae sunt primo nota, sunt magis facilia. Sed dicendum, quod magis universalia secundum simplicem apprehensionem sunt primo nota, nam primo in intellectu cadit ens, ut Avicenno dicit, et prius in intellectu cadit animal quam homo. Sicut enim in esse naturae quod de potentia in actum procedit prius est animal quam homo, ita in generatione scientiae prius in intellectu concipitur animal quam homo. Sed quantum ad investigationem naturarum proprietatum et causarum, prius sunt nota minus communia; eo quod per causas particulares, quae sunt unius generis vel speciei, pervenimus in causas universales. Ea autem quae sunt universalia in causando, sunt posterius nota quo ad nos, licet sunt prius nota secundum naturam, quamvis universalia per praedicationem sint aliquo modo prius quo ad nos nota quam minus universalia, licet non prius nota quam singularia; nam cognitio sensus qui est cognoscitivus singularium, in nobis praecedit cognitionem intellectivam quae est universalium. Facienda est etiam in hoc vis quod maxime universalia non dicit simpliciter esse difficillima, sed " fere illa enim quae sunt a materia penitus separata secundum esse, secit substantiae immateriales, sunt magis difficilia nobis ad cognoscendum quam etiam universalia; et ideo sita scientia, quae sapientia dicitur, quamvis sit prima in dignitate, est tamen ultima in addiscendo. (58) Ibid. no. 46.

The distinctions between most knowable *in se* and most knowable *quoad nos* is a key for understanding not only the ancient Greeks but also all modern idealistic philosophies. And the confusion of these two comes, as we have seen, from a lack of understanding of the analogy of Being. We think that Heraclitus already had some idea of this analogy when he contrasted the Fire with the heavy elements of the Way Down.

We cannot agree with the Marxists that the Fire of Heraclitus is comparable to Matter in their own doctrine. The Fire is a divine Being, a Logos that is prior to the material universe, whereas Matter, in dialectical materialism, is opposed to the divine; it is irrationality. What is the most important attribute of the Fire is not its materiality but rather its directing force. Marxists say that Mind is the product of the evolution of matter; Heraclitus makes Mind prior to all evolution and all of Nature. Hence Heraclitus would be in Engels conception of philosophy an idealist.

Heraclitus wished to preserve God as pure as possible, as distinct as he could be from the material universe, without, however, losing any of his prerogatives as supreme Being. Thus he considered the divine nature as Fire, something light, pure and active. This he contrasted with the elements of earth and water. Here we have an approach to the immaterial Being who is the God of Platonic and Aristotelian philosophy. We should be most careful therefore when we call Heraclitus a materialist. He was still groping for an understanding

of spiritual substance. Thus he may be termed a negative materialist, in contrast with the positive materialism that is not merely an imperfect understanding of the nature of spiritual being, but is rather the positive denial of spiritual being. The Marxists belong to this latter class. Their's they have made the motto of Prometheus : "I hate all gods". And yet they consider their philosophy to be but an extension of the philosophy of Heraclitus for whom Wisdom consists in the knowledge of the One being that directs all things.

Empedocles :

Both because of his purpose and because of the content of his philosophy, Empedocles must be placed alongside of Heraclitus. Though the Marxists do not expressly claim a continuity with him, it is important for us to see that the doctrine of Empedocles confirms the analysis we have just made of Parmenides and Heraclitus.

His purpose was essentially the same as that of Heraclitus, namely to put God back into the universe --- from which the absolute interpretation of the One by Parmenides had tended to separate Him. The Parmenidean doctrine of Being absolutely distinct from the world of becoming seemed to both Heraclitus and Empedocles to endanger one of the supreme attributes of God, namely His causal bond with all that exists.

The Marxists however cannot invoke Empedocles as their forerunner, since he, too, spoke of a perfect and changeless God, a God who is perfectly One. Just as Heraclitus had done, Empedocles used the figure of recurring Fire to overcome what seems to be a contradiction : a God who is perfectly one, yet is intrinsically united to a world of change. The Sphairos, according to Empedocles, comes back to identity with himself in the world of change at fixed periods under the agency of the divine power of love. All the combinations and separations of the One, though in one sense real, are not absolutely

real. All change is overcome by the victory of Love.

The second extrinsic similarity with Marxist doctrine, the union of contraries, is also found in Empedocles. In the teaching of Empedocles Strife takes the place of the Way Down, while Love exercises the same function as the Way up in the Heraclitean doctrine. Marxists say that dialectical materialism, through its fundamental law of union of contraries, is only the scientific expression of something fundamental in nature, expressed long ago in poetical language by the ancients when the said that Love and Strife were principles of Nature.

The error of this interpretation comes when conflict is looked upon as the absolute, as that which accounts for all reality. The supreme Being is entirely overlooked, yet this is the most important element of the philosophy. The diversity that comes about through strife, the movement that characterizes the phenomenal world is not absolute. The One overcomes all this diversity and mutability.

Whereas Marxists would make diversity in the universe come through the blind activity of matter, Empedocles sees all things in nature as proceding from the eternal One who gives harmony to the whole.

We shall give those fragments that are most striking in their similarity to Heraclitean doctrine.

On the union of contraries :

no. 17. I shall tell thee a twofold tale. At one time it grew to be one only out of many; at another, it divided up to be many instead of one. There is a double becoming and passing away. The coming together of all things brings one generation into being and destroys it; the other grows up and is scattered as things become divided. And these things never cease continually changing places, at one time all uniting in one through Love, at another each borne in different directions by the repulsion of Strife. Thus, as far as it is their nature to grow into one out of many, and to become many once more when the one is parted asunder, so far they come into being and their life abides not. But, inasmuch as they never cease changing their places continually, so far they are ever immovable as they go round the circle of existence.

no. 16. For even as they, Strife and Love, were aforetime, so too they shall be; nor ever, methinks, will boundless time be emptied of that pair.

no. 20. This (the contest of Love and Strife) is manifest in the mass of mortal limbs. At one time all the limbs that are the body's portion are brought together by Love in blooming life's high season; at another, severed by cruel Strife, they wander each alone by the breakers of life's sea.

no. 21. Come now, look at the things that bear witness to my earlier discourse, if so be that there was any shortcoming as to their form in the earlier list. Behold the sun, everywhere bright and warm, and all the immortal things that are bathed in heat and bright radiance. Behold the rain, everywhere dark and cold; and from the earth issue forth things close-pressed and solid. When they are in strife all these are different in form and separated; but they come together in love, and are desired by one another.

no. 26. For they prevail in turn as the circle comes round, and pass into one another, and grow great in their appointed turn. There are these alone; but running through one another, they become men and the tribes of beasts. At

one time they are all brought together into one order by Love; at another, they are carried each in different directions by the repulsion of Strife, till they grow once more into one and are wholly subdued. Thus in so far as they are wont to grow into one out of many, and again divided become more than one, so far they come into being and their life is not lasting; but in so far as they never cease changin continually, so far are they evermore, immovable in the circle.

Fragments on the One :

11, 12 : Fools, for they have no far-reaching thoughts, who deem that what before was not comes into being, or that aught can perish and be utterly destroyed. For it cannot be that aught can arise from what in no way is, and it is impossible and unheard of that what is should perish; for it will always be, whereever one may keep putting it.

13 : And in the All there is naught empty and naught too full.

14 : In the All there is naught empty. Whence, then, could aught come to increase it ?

27 : There (in the sphere) are distinguished neither the swift limbs of the sun, nor, nor the shaggy earth in its might, nor the sea --- so fast was the god bound in the close covering of Harmony, spherical and round, rejoicing in his circular solitude.

27a: There is no discord and no unseemly strife in his limbs.

28 : But he was equal on every side and quite without end, spherical and round, rejoicing in his circular solitude.

35,36: But now I shall retrace my steps over the paths of song that I have travelled before, drawing from my saying a new saying. When Strife was fallen to the lowest depth of the vorrex, and Love had reached to the centre of the whirl, in it do all things come together so as to be one only; not all at once, but coming together at their will each from different quarters; and, as they mingled, strife began to pass out to the furthest limit; yet many things remained unmixed, alternating with the things that were being mixed, namely, all that Strife not fallen yet retain-

ed; for it had not yet altoghether retired perfectly from them to the outermost boundaries of the circle.

Fragments on wisdom, the knowledge of the One :

no. 132 : Blessed is the man who has gained the riches of divine wisdom; wretched is he who has the dim opinion of the gods in his heart.

no. 133 : It is not possible for us to set God before our eyes, or to lay hold of him with our hands, which is the broadest way of persuasion that leads into the heart of man. (59)

Empedocles is a confirmation of the point we wanted to make earlier, that Parmenides and Heraclitus are more alike than unlike. For in Empedocles we have the main points of doctrine of both --- the One of Parmenides who is like a perfect sphere, together with the world of the senses which cannot give us the One; and we have the eternal and ever recurring Fire of Heraclitus which is one, while at the same time we have the eternal becoming through the contrary principles. Empedocles permits us to see the parallels between the two seemingly opposite doctrines.

The Greek Atomists: Leucippus and Democritus.

The study of Greek atomism is very important as a background for an understanding of Marxism. The two most important doctrines through which Marxists claim a continuity with Greek atomism are, firstly, the doctrine of becoming, and secondly, the doctrine of chance in the universe. We shall study each of these in detail in order to see how far we can admit the Marxist claims of continuity of doctrine.

Atomistic doctrine of becoming : -

The atomists felt that the antinomy between the world of Being and the phenomenal world should not be expressed in the manner in which Parmenides had done. They felt that Parmenides had not sufficiently given account of the phenomenal world. They wanted to show that there could be an essential bond between the unchangeable Being and the world of change, without destroying the perfection of Being. Indeed, the perfection of Being would be increased, because it would now be given an active form (Motion), which was absent from the Being of Parmenides. Parmenides had excluded it, because he could see no way of admitting it without destroying the immutable character of the Supreme Entity.

The solution of the Atomists, in general,

consists in the substitution of an infinite number of tiny Forms which have the characteristics that Parmenides attributed to the one Being. Each of these tiny, invisible Forms is indivisible, continuous throughout, eternal, invariable, perfect, and, in addition to all these, is mobile. We can see already the form that the doctrine of the Atomists will take --- the perfect Being of Parmenides is preserved, but at the same time, there can take place various combinations and separations of the perfect Being. The Atoms in themselves are eternal and necessary --- and this remains the world of Being ---, but the groupings of atoms takes place in time and these formations change --- this is what corresponds to Parmenides' world of phenomena. We can also compare this to the eternal Fire of Heraclitus which is one and eternal, and to his ΠΑΝΤΑ ΡΕΙ which takes place in time.

A second element is now introduced in the doctrine of the Atomists ; this is the Void, which permits the movement of the Atoms so that the various combinations and separations can take place. Since the Forms (the Atoms) are continuous, full Being throughout, and are incapable of internal change and movement, all change and movement of phenomena must depend on the introduction of some other kind of reality, which must be so conceived as to permit the Forms to exercise their causal power. The other kind of reality may be regarded in two ways : from one point of view, it will be that which separates the Forms and prevents them from coalescing into the immovable, immutable Being of Parmenides, and from another point of view it will be the

opposite for the Forms. The Forms are full, but this new reality must be empty of Being; the Forms are Being, and this new reality is non-Being. Parmenides had denied the existence of non-Being, on the grounds that this would have given in an attribute that belongs essentially to Being. But, the Atomists, reply, if non-Being is not a reality, then the infinite and indivisible Forms would remain as sterile and as motionless as the One Being of Parmenides.

This non-Being, which is a reality, is called Space or the Void. It is this which permits the movement of the Forms. This Space is just the contrary of Being, the Continuum, in which nothing can move; it is absolutely empty of all Being. Space, as it were, tends to the destruction of the Plenum in so far as it can. It cannot destroy the eternal and necessary continuity of the Atom in itself, but it can separate one Atom from another and keep them from forming into one mass in which there is no separation. We can consider this a kind of conflict between Being and non-Being, a doctrine we shall consider at length in the Marxists. Being, according to its own nature, tends ever towards perfect continuity and homogeneity, while Space tends to create heterogeneity in the universe.

The conflict between Being and non-Being gives rise to becoming in the phenomenal world, as well as to passing away. The Forms move in the Space, but the force is given to the Forms through the whirling of the Vortex in which the Atoms are flying about as loose bodies. The shape and the size of the Atoms determine the combinations to a great extent, because those Atoms that have jagged edges will fit

together as well as they can with other Atoms with such edges. Likewese the bigger Atoms will come together because these (as the Atomists thought) have greater weight and so will fall with the same speed in the Vortex, while smaller Atoms will fall at a slower speed.

It is evident from this that there cannot be any real becoming in the Aristotelian sense in such a phenomenal world. We call it a phenomenal world, not because it is unreal, but because this is the world of the senses. This is the reality that is presented to sight, to touch, to taste, to smell, to hearing, while the unchangeable world of the Forms is the object of the intellect. We shall later compare the Wisdom in the Atomistic doctrine with that of the other Greeks. The only becoming and passing away consists in the new combinations of Forms or in their separation --- Forms which remain eternally the same.

The Forms are said to be infinite in number. In this infinity there is the minimum of diversity required to explain the heterogeneity found in the universe. The Forms (atomoi) differ only in shape and size. Formal differences in the universe come about through the combination and separation of the Forms after they are given a propulsion by the whirling of the Vortex. This doctrine calls to mind the statement of Descartes, that he could construct any natural universe, once he had extension and motion.

It is already clear that this teaching differs

from Marxism which decries the need of a force extrinsic to matter to explain becoming. This is the very weakness Marxism said it found in classical materialism...it meant dependence of a First Mover.

The nature of the Vortex is not explained. What gives rise to the whirling motion ? The Atomists hold that it was always in motion. It is an eternal motion. We could very well explain this in terms of Prime Mover in Aristotelian philosophy. But of its nature the Atomists are silent --- as least as far as we can judge from the writings we have. One thing, however, seems certain : there is need of some Force extrinsic to the universe and even extrinsic to the infinite number of Forms in order to explain becoming. In this respect, the Atomistic doctrine differs essentially from the Marxist, who give to matter an intrinsic principle of motion.

We shall now quote at length the sources we have for the Greek Atomistic teaching.

Simplicius, Physics, 28, 4 :

> Leucippus of Elea or of Miletus (both accounts are given) shared his philosophy with Parmenides, but dit not follow the same method that Parmenides and Xenophanes followed in the explanation of things that are, but, as it appears the opposite method. They had represented the All as One, immovable, eternal and limited, and did not permit even the investigation of non-Being; Leucippus assumed infinite and forever moving elements, the indivisible Beings, and an Infinite number of Forms among them, because there is no real difference in quality in any phenomenon, and because he saw incessant coming into being and change in things that are. Moreover Being does not

exist any more really than non-Being. For he assumed that the Being of the indivisible Beings was compact and full, and he called it What Is (Being), and said that it moved in the Void, which he called non-Being, and which he said existed no less than Being.

And similarly his comrade Democritus of Abdera established the Full and the Void as first principles, and called one of them Being and the other non-Being; for Leucippus and Democritus assume the indivisible Beings as the matter of beings that are, and by the differences in the Beings they produce everything else. These differences are three : Form (ῥυσμός), Turning (τροπή), and Contact (διαθιγή), and they have the same meaning as Shape (σχημα)Position (θεσις), and Arrangement (τάξις). For by nature like things are moved by like things, and things that are akin rush together, and each of the Forms, when it is arranged in a different combination of Forms, produces a different arrangement; so that they claimed with good reason that since these first principles were infinite thry would produce all substances and all modifications of them. Accounting both for the cause of everything that comes into being and for the manner in which it comes. Wherefore they even make the claim that only those philosophers who represent the elements as infinite can argue that all things take place in accordance with Reason. And they say that the number of Forms, among the indivisible Beings, is infinite, because there is no real difference in quality in anything. This, they say, is the cause of infinity. (i.e., of the infinitely different qualities apparent in phenomena, which qualities do not really exist.) (60)

Theophrastus, Opinions, Book I,

They made the All one, immovable, uncreated, and finite, and did not even permit us to search for elements, namely, the atoms. And he made their forms infinite in number, since there was no reason why they should be of one kind rather than another, and because they say that there was unceasing becoming becoming and change in things. He, further, held that what is is no more real than what is not, and that both are alike causes of things that come into being : for he laid down that the substance of the atoms was compact and full, and he called them what is, while they moved in the Void which he called what is not, but affirmed to be just as real as what is. (61)

Aristotle, de Gen. et Corr., A, 8, 324b 35 :

Leukippos and Demokritus have decided about all things practically by the same method and on the same theory, taking as their starting point what naturally comes first. Some

of the ancients had held that the real must necessarily be one and immovable; for, said they, empty space is not real, and motion would be impossible without empty space separated from matter; nor, further, could reality be a many, if there were nothing to separate things. And it makes no difference if any one holds that the All is not continuous, but discrete, with its parts in contact, instead of holding that reality is many, not one, and that there is empty space. For if it is divisible at every point there is no one, and therefore no many, and the Whole is Empty; while, if we say it is divisible in one place and not in another, this looks like an arbitrary fiction; for up to what point and for what reason will part of the Whole be in this state and be full, while the rest is discrete ? And, on the same grounds, they further say that there can be no motion. In consequence of these reasonings, then, going beyond perception and overlooking it in the belief that we ought to follow the argument, they say that the All is one and immovable, and some of them that it is infinite, for any limit would be bounded by empty space. This, then, is the opinion they expressed about the truth, and these are the reasons which led them to do so. Now, so far as arguments go, this conclusion does seem to follow; but, if we appeal to facts, to hold such a view looks like madness. No one who is mad is so far out of his senses that fire and ice appear to him to be one; it is only things that are right, and things that appear right from habit, in which madness makes some people see no difference.

Leukippos, however, thought he had a theory which was in harmony with sense, and did not do away with coming into being and passing away, nor motion, nor the multiplicity of things. He conceded this to experience, while he conceded, on the other hand, to those who invented the One that motion was impossible without the Void, that the Void was not real, and that nothing of what was real was not real. "For", said he, "that which is strictly speaking real is an absolute plenum; but the plenum is not one. On the contrary, there are an infinite number of them, and they are invisible owing to the smallness of their bulk. They move in the void (for there is a void); and by their coming together they effect coming into being; by their separation, passing away".

Aristotle, de Gen. et Corr., 315 a 34 :

In general no one made any more than a superficial inquiry into these problems except Democritus; he seems to have studied them all, and is far superior in his method. For, as we are saying, none of the other philosophers made any definite

statement about growth, except such as any amateur might have made; they said that things grow when like joins like, but they did not explain the process, nor did they give any account of combination, or of any of the other problems, such as action and passion, how in all actions in nature one things acts and another is acted upon. But Democritus and Leucippus assume the Forms and make alteration and coming to be result from them; they explain coming to be and perishing by the dispersion and the union of the Forms, and alteration by their arrangement and position. And since they thought that the truth lay in the appearance, and the appearances are opposite and infinite, they made the Forms infinite, so that by reason of the changes in any compound the same thing presents opposite appearances to different people; its movement changes when a small addition is made of it, and it appears totally different when the position of one thing is changed. (62)

Diogenes Laertius, IX, 31 :

The All is infinite; part of it is full, and part of it void, and these he calls elements. From these the infinite universes are derived and into them they are dissolved. In this way universes come into being; many 'bodies of all sorts of Shapes are cut off from the Infinite and rush into a great void; these gather together and form a single revolution, in which they jostle and revolve in every way, and finally separate, like joining like. And since owing to the crowd they can no longer revolve in equilibrium, the fine Shapes depart to the outer void, as if sifted out; the rest stay together and becoming entangled run down together with each other and form a kind of first spherical system. (63)

Chance in the Atomistic world :

There are two kinds of simplicity which lie in wholly opposite directions. A gas, for example, will be called simple if it is made up of one kind of atoms. A universe made up of homogeneous elements is simple in this material sense. On the other hand, a whole may be called simple when, notwithstanding their great variety, its parts are harmoniously coordinated in view of some definite function. Thus, notwithstanding its greater complexity of parts, a modern automobile will operate more simply than the earlier type; and the movements of a tiger are more simple than those of a truck. In these particular examples, formal simplicity can be realized only by means of what is materially highly complex.

The atomist school of philosophy has not taken this distinction into account. Indeed all science tends toward simplicity. But the simplicity it tends toward is not of one type alone. Material reality involves both types of simplicity. We must indeed try to account for as much as we possibly can by material simplicity. But we shall not fail to distort reality if we refuse to recur to anything but material simplicity.

A great variety of constructions can be made with the same building material. But it is not just the building material that accounts for this variety. We must not forget the structure

itself and the cause of the structure as such. Indeed the building material has been prepared for the sake of buildings, and the buildings for the sake of inhabiting. If we refused to consider anything but the building material, then the buildings and their variety could be explained only as fortuitous conglomerations of bricks, boards, etc. A house would be such or such, according as the building material happens to be together in such or such a way. It would therefore be more correct, in this view, to say that the material has "fallen together" in such or such a way, than to say that it has been "brought together" in this or that way.

Although the ancient Greek atomists certainly did not hold exclusively this view, not even in their doctrine of chance, it is nevertheless this part of their philosophy which has come down to us as typical of atomism. And this is in fact the only part of Greek atomism that the marxists care to remember : an atomism which prescinds from formal and final causality, at least as far nature is concerned.

The present state of our universe, they say, is due to pure chance, to the "blind movement of matter". They will not even admit the use of the term "evolution", both because this is opposed to their doctrine of violent change and because it already implies a certain direction on the part of matter. Nature develops through violent destruction of previous forms, through jumps, without

direction of any kind.

It is true that, in constructing things, the form of the work come from us. The work of art is well known to us because it was born from our own understanding. The differences of houses come from us. But the differences in nature do not come from us. Just as to understand what a hammer and a sickel are we must know their purpose, we must know why they are "this way", so, in order to know natural things in the manner in which we know the works of human art, we must know their purpose. Otherwise we are like savages who, visiting a workshop, see all that is there without really seeing it.

In natural science we attempt to reduce the material manifold by the search for uniformity, recurrence, regularity; we attempt to unify the laws by means of simple hypothesis, etc. We try as much as possible to see the many as instances of the same. This does not mean that the aim of science is to do away with all formal differences. However, atomism, or that part of it which history has emancipated, seems to hold that differences are accounted for only when we have somehow suppressed them. They would not deny that there are differences, nor that they should be brought about. But they would deny the differences as having absolute primacy over the stuff of things. They would deny that material differences are for the sake of form. (64) Formal differences are considered as obstacles to thorough understanding.

Now there is some truth in this position.

Nothing is knowable except through its form. But what is most knowable in itself is least known to us. What we know first and best is confused universality. Our mind is at home only in twilight reality, as Aristotle said. (65) Our intellect can operate only in the face of beings comprising a certain amount of objective obscurity. Potentiality is responsible for objective obscurity. Because of their greater knowability in se, formal differences are less known to us. But to reduce the formal differences to what is most knowable to us is to reduce the very nature of the universe. This would mean that man is "explained" when prescinding from his formal difference, rationality, we consider him merely as an animal.

We agree that formal differences are less knowable to us. In this sense they are relatively irrational. There is, then, a heterogeneity which is an obstacle to knowledge. But the solution to this difficulty must not consist in reducing the status of the object, but rather in lifting the status of the knower.

The exact extent to which the following consideration would apply to Democritus is uncertain, but it does apply to the marxist understanding of him. How can we overcome natural heterogeneity without accepting it in its absolute priority and intelligibility ? How can form become subservient to matter ? It is because the marxists make such a great case for the "materialism" of the Greek atomists that we must examine it carefully.

There are two fundamental types of heterogeneity : that of incongruous assemblage, such as a junk-pile where a variety of objects just happens to be together, and that of an orderly, reasonable ensemble. The first is purely material, the ensemble has come about without any purpose except keeping certain objects together in no matter what fashion. Chance may account for such a kind of order. Chance is an irrational cause(παρὰ λόγον). If the effect of chance serves a purpose, the purpose was not intended by the cause that is chance. Thus chance is an irrational cause in natural things, just as fortune is an irrational cause in human actions.

Unreason, then, can account for a certain type of heterogeneity. Can it account for both kinds of heterogeneity ? Chance is an accidental, indeterminate cause in those things which happen for the most part by nature. Hence, there is finality in chance, but the end in question is not an end intended. It just happens to coincide with an intention, an intention of achievement or of avoidance. Hence, a formal heterogeneity may be brought about by chance. But, and this is essential, this heterogeneity must still be defined through nature, just as chance itself supposes nature and action for an end. Without reference to finality acieved by intention, chance is meaningless even as chance.

Chance is an irrational cause. An irrational cause may be the cause of a rational end. But if all causes were irratio-

nal, no end would be rational. Now, if homogeneous elements were to account sufficiently for the heterogeneity of the universe, it could only be the product of chance. Better, it could not even be the product of chance, since chance has no meaning outside of rational finality.

Let us suppose for one moment, merely for the sake of argument, that all things do come about by chance. It would follow that there never could be but the appearance of rationality, the appearance of form. Reason itself would be but an appearance. And reason would be most reasonable when it leads everything back to unreason. The complete rationalisation of the universe would consist in making it fundamentally irrational. Reason itself would be the product of unreason, of irrationality.

We have conceded that there is a respect in which that which is most intelligible in itself is most irrational to us. But the cause of this irrationality is in us. In this connection we must again distinguish two types of heterogeneity. One which is on the part of the things known and which comes from their difference of form; the other which is on the part of our intellect in the very means by which we know different natures. For each nature distinctly known, we have a distinct intelligible species. Thus the intelligible species by which we know circle is distinct from the species by which we know polygon. The heterogeneity of things can be known by us only through heterogeneous species. This last heterogeneity has its proper cause in

the very imperfection of our intellect. Perfect knowledge would attain the differences of things through one single means of knowing. (66) The heterogeneity of intelligible species has its cause in the imperfection of our intellectuality; it is, in this sense, a consequence of irrationality.

To what extent the Atomists identify these two is not clear --- there is evidence for and against the identification. But it is clear the Marxist philosophers do identify them, since they say that every form in nature comes about through the blind movement of matter, even the highest form of all, the human intellect.

We have only one fragment of the writing of Leucippus, the founder of the school of Atomism. It is this : "Nothing comes into being by chance, but all according to reason." (67) This fragment seems to do away entirely with chance, yet other writers, in speaking of Leucippus and Democritus said that the Atoms come together and separate through chance. The solution seems to be contained in Aristotle's reference to the Atomists.

> There are some, too, who ascribe this heavenly sphere and all the world to chance. They say that the vortex arose spontaneously, i.e. the motion that separated and arranged in its present order all that exists. This statement might well cause surprise. For they are asserting that chance is not responsible for the existence or generation of animals and plants, nature or mind or something of the kind being the cause of them (for it is not any chance thing that comes from a given seed but an olive from one kind and a man from another); and yet at the same time they assert that the heavenly sphere and the divinest of visible things arose by chance, having no such cause as is assigned to

> animals and plants. Yet if this is so, it is a fact which deserves to be dwelt upon, and something might well have been said about it. For besides the other absurdities of the statement, it is the more absurd that people should make it when they see nothing coming to be by chance in the heavens, but much happening by chance among the things which as they say are not due to chance; whereas we should have expected exactly the opposite. (68)

Is chance the first cause of the universe according to the Atomists ? As far as the individual natures in the cosmos are concerned, they say that these are the work of a Mind or Reason. But the heavenly bodies, which for the Greeks were superior to the mobile things of the phenomenal world, and were, in fact, considered the proximate cause of the phenomenal world, these were due to chance. But, as Aristotle points out, the phenomenal world should rather have been thought the work of chance rather than the heavens, because of the irregularity often found in nature. To the ancients the heavens appeared to have absolute determination in their movement.

Aristotle says that chance cannot be a cause prior to intelligence, because chance is an accidental cause. If we do admit, he says, that the heavens did come about through chance, then we must posit prior to this a <u>per se cause</u> which acts according to intellect.

> Fortune and chance are causes of effects which, though they might result from intelligence or nature, have in fact been caused by something incidentally. Now since nothing which is incidental is prior to what is per se, it is clear that no incidental cause can be prior to a cause per se. Fortune and chance, therefore, are posterior to intelligence and nature. Hence, however true it may be that the heavens are due to spontaneity, it

will still be true that intelligence and nature will be prior causes of this All and of many thing in it besides.
(69) Aris. Phy. II, c. 6, 198a 5.

Whether the Atomists thought there was an Intelligence prior to the motion of the Vortex in which the heavens came about through chance, we do not know. If they thought that chance was absolutely the first cause, and Mind itself comes about only through the various combinations of Atoms, falling together by chance, then they would be very close to the Marxist doctrine.

Like Parmenides and Heraclitus the Atomists recognize a world of fixed Being and a world of changing phenomena. And Wisdom consists in the knowledge of the former, while our opinions about the latter are often mistaken. Democritus and Leucippus also compare the permanent Being of the most perfect Atoms to the Fire of Heraclitus and to the Sphere of Parmenides.

Some say that what originates movement is both pre-eminently and primarily soul; believing that what is not itself moved cannot originate movement in another, they arrived at the view that soul belongs to the class of things in movement. This is what led Democritus to say that soul is a sort of fire or hot substance; his "forms" or atoms are infinite in number; those which are spherical he calls fire and soul, and compares them to the motes in the air which we see in the shafts of light coming through windows; (70)

Leucippus and Democritus assume that bastard knowledge belong to all these things, sight, hearing, smell, taste, touch; but legitimate knowledge is separated from this...(71)

Sextus Empiricus : VIII, 6, 71
Plato and Democritus both supposed that only the objects of thought really existed : Democritus believed because

there was no sensible substance underlying nature, since the Indivisibles which formed all things by their combinations had a nature devoid of all sensible quality;

> Healthful R$_e$ason, which is the Sun of the Psyche, can alone, when it has risen within the dpeth of the Mind, illuminate the eye of the Psyche : when Democritus quite rightly says that 'a few men, who possess Reason, stretch out their hands towards that which we Greeks now call Air and address it as Zeus; for Zeus knows all things, gives and takes away all things, and is King of all things. (72)

So once again we have the doctrine of the immutable One and the changing many. And corresponding to the One we have wisdom while the knowledge of the world of becoming is the object of the senses.

Anaxagoras :

Two principles govern the philosophy of Anaxagoras : the infinitely small and the Nous. It is true that Marxists have not claimed an essential continuity with the philosophy of Anaxagoras, yet there is a certain similarity between these two doctrines that future Marxists might try to exploit. It is the similarity on the point of the infinitely small, or, the principle : Quodlibet ex quolibet. Now the Marxists, who hold that all reality has as its basis matter, might conceive of this latter as a mere clarification of Anaxagoras' teaching. And secondly, there is another similarity in that the Marxists, too, speak of the infinitely small when they propose certain arguments for dialectical contradiction from the field of mathematics. We shall what the infinitely small of Anaxagoras is, so that we may later compare it with the Marxist notion.

How does Anaxagoras arrive at his infinitely small ? Aristotle's probable explanation follows :

> The theory of Anaxagoras that the principles are infinite in multitude was probably due to his acceptance of the common opinion of the physicists that nothing comes into being from non-Being. For this is the reason why they use the phrase ' all things were together' and the coming into being of such and such a kind of thing is reduced to change of quality, while some spoke of combination and separation. Moreover, the fact that the contraries proceed from each other lead them to the conclusion. The one, they reasoned, must have already existed in the other; for since everything that comes into being must arise either from what is or from what is not, and it is impossible for it to arise from what is not (on this point all the

> physicists agree), they thought that the truth of the alternative necessarily followed, namely that things come into being out of existent things, i.e. out of things already present, but imperceptible to our senses because of the smallness of their bulk. So they assert that everthing has been mixed in everything, because they saw everything arising out of everything. But things, as they say, appear different from one another and receive different names according to the nature of the particles which are numerically predominant among the innumerable constituens of the mixture. For nothing, they say, is purely and entirely white or black or sweet, bone or flesh, but the nature of a thing is held to be that of which it contains the most. (73)
>
> (Aristot. Physic. I, c. 4 187 a 26--b6.

The principle regarding the infinitely small is expressed in Latin either as : Quodlibet ex quolibet; or as : Quodlibet in quolibet. They both fundamentally mean the same. There are portions of everything present in every other thing; and everything that comes to be now has already existed in act in some other combination.

However small any portion is, it will always continue to contain portions of everything else. Thus the infinitely small means that none of the elements that enter into the composition of the material universe can be exhausted; nor can any element every be completely separated from the rest of the physical world. Consequently, there is never a greatest or smallest portion of that which makes up the cosmos. (74)

We can consider the infinitely small of Anaxagoras to be somewhat like matter in the doctrine of Aristotle. For it is the infinitely small that enters into all compositions

in nature. If we were to judge the nature of the infinitely small only from this angle, however, we should have to say that it differs essentially from the matter of Aristotle, since the infinitely small according to Anaxagoras is always in act. Nothing, according to him, comes to be except from what is already in act. And in the Aristotelian doctrine matter is not act, but potency. If we conclude from what is implicitly contained in Anaxagoras, however, we can say that he already approached the Aristotelean notion of matter and potency. Since the infinitely small is divisible, this means that already potency --- potency to division --- is accepted. And secondly, this is called infinite divisibility, which is comparable to the infinite capacity of matter for corporeal forms. Matter is capable of receiving an infinite variety of natural forms, even though they cannot be received simultaneously.

Anaxagoras makes the infinitely small divisible ad infinitum, in order that his principle, Quodlibet ex quolibet, might be saved. If anything comes from anything else, if any nature contains within itself portions of every other nature, then there must be divisibility ad infinitum, other-wise a condition would be reached by simple division where certain natures or elements would have separate existence.

The following are the fragments on the infinitely small :

Fragment no. 1: All things were together, infinite both in number and in smallness; because the small was infinite. And when all things were together, nothing could be seen, because of the smallness of everything; for Air and Aither held all things strongly, being both of them infinite; for among all things taken together Air and Aither are the greatest both in quantity and in magnitude.

no. 3: For there is no smallest of that which is small, but there is always a smaller; for Being cannot be non-Being. And there is always a greater of that which is great. And the quantity of the great is equal to the quantity of the small; and each thing by itself is both great and small.

no. 4: Since these things are so, we must think that there are many things of every sort in all the universes that are Being combined and that there are in them seeds of all things, and that these seeds have every sort of form and color and sensible quality. And human beings are put together, and all other animals, as many as have Psyche (life)...Before the separation took place, when all things were together, there was not even any color to be seen, for the mixture of all things prevented the mixture of moist and dry, of hot and cold, of bright and dark, and of much earth that was in it, and of a quantity of infinite seeds that were in no way like each other. Since these things are so, we must think that all things are present in the sum of Being.

no. 5: And after these things have been thus separated, we must know that the sum of all things is neither smaller nor greater, for it is impossible that there should be more than the sum of all things; but the sum of Being is always equal.

no. 6: And since the portions of the great and of the small are equal in quantity, but for this reason also all things must be in everything; for all things cannot be apart, for all things have a part of everything. Since the absolutely smallest thing cannot exist, it could not be separated, nor could it come into being by itself; but it was in the beginning so even now all things are together. Many things are present in all things, and they are equal in quantity, both in the greater and in the smaller of those things that are separated off.

no. 8: The things that are in one universe are not separated from each other, nor are they cut off by an axe, neither hot from cold nor cold from hot.

no. 11: in everything there is a portion of everything, except Mind, and in some things Mind also is present.

> no. 17 : The Greeks do not have the correct notion about becoming and perishing; for nothing comes into being or perishes, but there is only mixture and separation out of things that exist. And thus they might rightly call becoming a mixture, and perishing a separation. (75)

It should be noted that no given element can have wholly separated existence from other elements. There can be, for Anaxagoras, no such thing as pure water, for example. We have have in things but an approximation to the state of separation. On the other hand, the universe as distinct from the Nous, has in it merely the stuff of things. The matter necessary to make them is there, but there is no reason intrinsic to this stuff, which would be the cause of the orderliness, the combinations, the separations that are presented to our senses. Since the elements can have no separated being, and since there is no particular reason why one or the other should have a predominance accounting for the order in the universe, the predominance approaching the state of separation is brought about by the Nous who has separate existence, who exists apart from things.

The following are the fragments on the Nous :

> Frag. no 12 : Other things have a portion of everything; but Mind is infinite and has sovereign power and is mixed with nothing, but is alone, itself by itself. For if it were not by itself, but were mixed with anything else, it would have a part of all things, if it were mixed with anything; for there is a part of everything in everything, as I have said in what goes before; and the things that would be mixed with Mind would hinder its action, so that it could not be supreme over anything in the same way that it is now when it is alone and by itself. For Mind is the most subtle of all things And the purest, and it possesses all knowledge about everything and has the greatest strength. And as many things as have

> Psyche, both smaller and greater things, all have Mind from their supreme Ruler. And Mind was supreme over the whole revolution, so that the revolution took place in the beginning. And the movement of revolution began with that which was small, and it revolves over a greater spalce, and it will revolve over still more space. And Mind knew all the things that were mingled and separated and distinguished. And all the sorts of things that were to be and that were, including all those that do not now exist, and all the sorts that do now exist, all these Mind arranged into a universe, and it also arranged this movement of revolution in which the stars now eevolve and the sun and the moon and the Air and The Aither, that are separated...but nothing is wholly separated or distinguished from anything else except Mind.
>
> no. 13 : And when Mind began to set things in motion, it was separated from all that was moved, and everything that Mind set in motion was rendered wholly distinct; and as things were set in motion and rendered distinct, the movement of revolution caused their distinctness to become much greater. (76)

The method of limits gives us a deeper insight into the philosophy of Anaxagoras, because it permits us to see more accurately the function of each of the principles : the infinitely small and the Nous.

According to our method of limits we may first of all consider the infinitely small as a variable. By this we mean that in every portion of everything, no matter how much it is divided, no matter into what degree the element is separated from the other elements, there can never be an ultimate separation of one element from all the others or from any single one of the others. There always has been and there will always be all elements in every individual portion. This is a variability, which is variable ad infinitum.

Now the variability comes about because of

the divisibility of the individual elements. There can be a greater or a lesser amount of an element in a combination. And this is how the Nous brings about the various combinations that appear to the senses. For example, it would use a great amount of one element and smaller amounts of other elements, and consequently the name that would be applied would correspond to the nature of the element that exists there in greatest abundance.

Finally, the ideal limit (and it is necessarily an ideal) is the absolute separation of one element from the others, so that it would have a separate existence. If that limit could be reached any change would be impossible after that, for it is absolute, homogeneous and separated from all other elements that could change it.

Thus the phenomenal world consists of the various combinations that the infinite variety of elements can assume under the direction of the Nous. This world is not stable; it is not homogeneous; it is not the absolute Being that would exist, if the Nous could so divide the Quodlibet in quolibet so that a smallest division would finally be reached, or so that by combining all the elements of one kind a maximum would be reached that would consist only of one kind --- homogeneity absolutely speaking. Only complete separation could give one of the elements absolute Being.

The following diagram will illustrate the

phenomenal world and the unchanging world of absolute Being.

a) Quodlibet in quolibet $\xrightarrow{n}$ absolute separation

b) Phenomenal world of change and multiplicity $\xrightarrow{n}$ unchangeable world of absolute Being and homogeneity

c) $1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} \xrightarrow{n} 2$

The phenomenal world, which is bound up essentially with the Quodlibet in quolibet cannot have the stability that would be reached at the ideal limit, where the element would attain absolute and distinct existence. The attempt to reach such a being cannot be realized, and consequently as long as we remain in a universe where we consider elements as the principles of being, we can never have being in the complete sense. The only Being that can be completely separated from the material universe is Nous. If per impossible one element could be entirely separated from the rest of the phenomenal world, that is from the other elements, this being would necessarily have to be identified with the Nous, which is a spiritual being. Such is evidently a contradiction.

Anaxagoras called upon the Nous, as we have said, to explain the world of becoming. Now he confused the general problem of

Becoming with the problem of Finality and Order in the universe. Because he did not explain Becoming through the intrinsic causes as Aristotle did, he had to have recourse to an extrinsic cause to explain it. That is why Aristotle finds fault with him. It is not because he introduced the supreme Nous, but because he introduced the Nous as a deux ex machina to explain becoming that should have been explained according to natural principles. And whenever Finality is required to explain something in Nature, then he has recourse to causes other than the Nous --- thus not sufficiently stressing Nous.

> For Anaxagoras uses reason as a deux ex machina for the making of the world, and when he is at a loss to tell from what cause something necessarily is, then he drags reason in, but in all other cases ascribes events to anything rather than to reason. (77)

And Plato criticises Anaxagoras for the same confusion :

> Then I heard someone read out of a book which was, he said, by Anaxagoras that 'Mind forms the universe and is the Cause of all things', and I was delighted with this Cause, and I decided that Mind must really be in the same sense the cause of all things. If this is so, I thought, the Mind that is the source of universal Order must arrange each particular thing in the best possible way...and I rejoiced to think that I had found in Anaxagoras a man who would teach me about such a cause... I would not have sold my expectations even at a great price, but seized his books enthusiastically and read as fast as I could, in order to know at once the truth about what is better and what is worse. Farewell to my marvellous hopes. As I went on reading, I beheld a man who made no use whatever of Mind, who ascribed to it no role in the production of the cosmic order, but who on the contrary ascribed all causal action to Airs, and Aithers and Waters, and many other strange things. (78)

General conclusion of Anaxagoras :

The continuity of Anaxagoras doctrine with that of the other ancient Greeks seems to us to be beyond serious doubt. The doctrine of the One, of the world of change, of Wisdom retains the same essential characteristics in all the ancient Greek "materialists". We do, however, have a certain progression, a certain perfecting of conception of the nature of the One supreme Being. Aristotle did not start without a long tradition behind him, when he gave the world his teaching on the nature of the Immaterial God that rules the world, nor was he without the beginnings of the doctrine of matter and form when he proposed the hylomorphic conception of the natural beings. The Greek materialists had conceived the notion of a God who is immutable, eternal, necessary, the source of all things, and apart from the world of change, at least in his own nature. And in contrasting the world of Being with the world of change, they compared God to Fire to Air, things which are pure and light, while in contrast with this the Many participates also in non-Being which is compared to earth and water, which are elements heavy, cold, and impure. Already, then, there is an approximation to the immateriality of the God of Plato and Aristotle.

General conclusion of historical part :

We do not find in the ancient Greeks anything

more than an accidental likeness with Marxism. We do not see upon what grounds Marxists can claim a continuity with Heraclitus, with Democritus, with Empedocles, or with any of the other early philosophers that we have considered. The fundamental difference, we believe, lies in this, that Marxists deny finality in nature, while the ancients, while not teaching it as clearly in Aristotle, at least advanced towards the doctrine of finality that was to be found later in Aristotle. Closely allied to the doctrine of finality is the teaching on the One Being who is separated from the phenomenal universe, which is, in fact, the Logos or Ratio that directs all things in the universe. The Marxists who refuse to admit any intelligence directing the universe, but who want to explain all movement through the intrinsic conflict of blind matter, cannot have a continuity with a philosophy which teaches the necessity of a Logos.

We certainly admit that the ancient Greeks did not clearly express the idea of spiritual substance --- and because of this the Marxists want to make them materialists in the same sense in which they themselves are materialists. In order to express the difference between the Marxists and the ancients on this point, we can consider the development of the idea of God, of spiritual substance to be like the formation of a vase in the hands of the potter. The vase takes time to form. The advance in the knowledge of the Spiritual, with all the imperfection and crudeness of form through its period of being molded, is really the beginnings of the philosophy that was later to be

so highly developed by Aristotle. Now Marxism is the shattering of the vase that has been formed. Marxism is positive materialism; it is not merely an imperfect expression of the truth. The shattered parts of the vase still bear a certain resemblance with the original, just so does Marxism bear a certain resemblance with the philosophy of the ancient Greeks. But what is essential is no longer there. The pieces of a vase are not a vase. And all the attempts of Marxist philosophers to give rationality to the universe through their materialistic principles will be just as futile as throwing the pieces of vase into the air and expecting them to come down to earth ready to hold flowers. The positive materialism of Marxism is definitely distinct from the negative materialism of the ancients.

END OF HISTORICAL PART.

PART II : Dialectics of Nature

CLASSICAL MATERIALISM :

Classical materialism had an essential weakness, according to the advocates of dialectical materialism, for it remained bound to the static way of thinking that is characteristic of metaphysics. Because of their inability to think dialectically classical materialists were impotent in the face of Hegelian dialectics which better accounted for real becoming in the world. (79)

The classical materialists thought an explanation of all phenomena must be sought in the mechanical motions of qualitatively identical and unchanging units (atoms, electrons, etc. in our modern terminology). All qualitative differences among things are due to the difference in the position of these units, and to the difference in their simple mechanical motion, that is, movement in space. Hence quality does not exist in actual reality but depends entirely on our subjective perceptions. Objectively there exists only the mechanical motion of atoms and their quantitative relations. This materialism denies the higher forms of motion and reduces all movement to local motion.

Obviously such a reduction cannot be made.

This leaves the way open to the extreme of metaphysical thought, namely the existence of a Being extrinsic to the universe upon whom motion in the universe depends. (80) Mechanical motion is not self-explanatory; it is not self sufficient. Some force external to the world must set in motion the gigantic mechanism that is the world. Mechanical motion has not an intrinsic source of power. The world according to this conception would need someone to wind up the power that is released in motion, like some giant clock in the hands of its maker.

To be valid materialism must be self sufficient. It must contain within itself an energizing element that can account for every change in Nature. Mechanical motion, as we have seen must itself be explained. The classical materialists did not all receive the full heritage of mechanism from Descartes, for, as Marx says, "In his physics Descartes had invested matter with self-creative power and had conceived of mechanical motion as its vital act." Descartes had not, of course, developed the notion of matter as a sufficient production cause of all things for that was to come only with the dialectical materialists, through the use of Hegelian dialectics.

Mechanical materialism was unable to comprehend the universe as a process, as matter developing in a historical process. As Engels explains (81), this was in accordance with the level of the natural sciences at that time. It was held that motion turned eternally

in a circle and never progressed; it produced the same results over and over again. The dialectical view of nature, according to which matter itself was in a continual state of productive development through intrinsic conflict, had not yet been conceived.

It was at this time that the classical German philosophy, which was to have its culmination in Hegel, was born. Its great merit was a dynamic view of reality. It went back to the early Greek physicists and found, according to the Marxists, an explanation in their dialectic of becoming through conflict even though the Greeks held the solution only in a germinal state. (82) Through observation and reflection Hegel worked out a complete Dialectic that completely rationalized all movement in Nature.

Marxist Dialectic :

When they describe their dialectical method Marx and Engels refer to Hegel as the philosopher who formulated the main features of this Dialectic. Not that Marxist Dialectic and Hegelian are one and the same thing. But the self-determining, (83) revolutionary principle is present in Hegelianism. That is why Lenin grew lyrical over what he found there. Writing to Maxim Gorky he said : "By gad, the philosopher Hegel was right --- life does progress by contradictions; and living contradictions are much richer, more varied and pithier than the mind of man originally conceived." (84)

What remained to be done was "the setting Dialectic back on its feet".

By Dialectic Hegel meant the progress of thought by means of contradiction, the process of development toward a supreme and absolute Spirit. He emphasized the fact that this movement was self-motion resulting from an inherent impulse to development. But this Dialectic is idealistic in its origin, in its movement and in the end to which it moves. It is a logical deduction beginning which the notion Being had through negative abstraction; its progresses through categories that are deduced by the mind itself rather than by the action of an object (even though Hegel insists he does not deduce the categories but that they deduce themselves); its end is the Absolute Spirit, a pure conception of logic.

Ludwig Feuerbach (1804-1872), one of the most talented of the disciples of Hegel, examined his master's philosophy from this point of view. He upset Hegel's basic proposition by maintaining that consciousness does not determine being, but being determines consciousness. There not only exists a world which is independent of thought, but it is that world which causes thought. Not only that --- there was a time when there was being without consciousness, for Mind is but ~~a but~~ a form of that objective reality. Hegelian philosophy, according to Feuerbach, is but another theology. All theology, Feuerbach says in his Essence of Christianity, was created by man himself --- it is but a way of man's expressing what

he is in himself. (85)

Nature exists independently of man, and it is the foundation upon which human beings, themselves the products of nature, have grown up. Nothing exists outside nature and man, and the higher beings our religious fantasies have created are only the fantastic reflection of our own essence. (86)

The idealists under the leadership of Hegel tried to solve the antinomy between unity and multiplicity as well as that between being and thinking by reducing all to unity of thought. For Hegel, Thought is Being. But, Feuerbach pointed out, it is not abstract Being which thinks, but it is real Being, namely, this person. And so, contrary to what the idealists assert, material Being is the subject, and thought is the attribute. And this is the only possible solution to an apparent contradiction between matter and spirit. With all his impulsive logical deduction Hegel must admit that Nature exists independently of the Thought that may be abe to rationalise the existence of such a Nature, but can never create it nor destroy it. Thus, in attaining unity, Hegel suppressed the real and independent existence of matter. (87)

Through this critique of Feuerbach, Engels was able to write :

> The unity of the world does not consist in its Being. The real unity of the world consists in its materiality, and this is proved...

> by a long and tedious development of philosophy and natural science. (A.D. p. 54) But if the question is raised : what then are thought and consciousness?, and whence they come?, it becomes apparent that they are products of the human brain and that man himself is a product of nature, which has been developed in and along with its environment; whence it is self-evident that the products of the human brain, being in the last analysis also products of nature, do not contradict the rest of nature but are in correspondence with it. (88)

According to Hegel the dialectical movement apparent in nature and history, which asserts itself through all zig-zag movements and temporary setbacks, is only a faint copy of the self-movement of Ideas going on from eternity. This ideological conception had to be done away with --- rather had to be reversed, for the dialectical movement of the mind was in reality only a reflection of the dialectical motion of the real world.

> My dialectic method is not only different from the Hegelian, but is its direct opposite. To Hegel, the life-process of the human brain, i.e., the process of thinking, which, under the name of "the Idea", he even transforms into an independent subject, is the demiurgos of the real world, and the real world is only the external, phenomenal form of "the Idea". With me, on the contrary, the ideal is nothing else than the material world reflected by the human mind, and translated into forms of thought. (89)

Marxist Dialectic is the general movement and development caused by the conflict of contradictions that take place throughout the universe both in nature and in society, and which is reflected in human thought. Hegel's philosophy touched only an ideal world; it is theoretical. Marxist philosophy puts it hands on the

real world of Nature; it is essentially a practical philosophy. Dialectical materialism is an instrument for the study and transformation of everything that exists. It involves practical revolutionary action. (90)

Criticism of Feuerbach :

It is often said that Marxism draws its Dialectic from Hegel and its materialism from Feuerbach. Just as we cannot say that the Dialectic of Hegel is identical with that of the Marxists, neither can we say that the materialism of Feuerbach was incorporated without change. What fundamentally separates Marx from Feuerbach is his historical approach and his concrete analysis of those factors of social life which appear in Feuerbach only as abstractions. (91) Though Feuerbach was well acquainted with the Dialectical method and used its principles, he did not apply it sufficiently in the case of man. Feuerbach had simply repudiated Hegel, without trying to see what was valid in the Dialectic when applied to society.

Marx saw that in fighting the speculative philosophy of Hegel, they could not ignore his method, for it was the perfect instrument for their own materialistic philosophy. And the value of the Dialectic was recognised in the early period of the development of Marxism. (92)

The Hegelian method was merely out of place --- it had to be "stood upon its feet" so that it could see the world as the reality which it is, rather than the distorted image it appeared to be in Hegelian logic, where the "Dialectic was standing on its head". (93)

> What distinguished Hegel's mode of thought from that of all other philosophers was the enormous historical sense upon which it was based. Abstract and idealistic thought it was in form, yet the development of his thoughts always proceeded in

> line with the development of world history and the latter was really meant to be only the test of the former. If, thereby, the real relation was inverted and put on its head, nevertheless its real content entered everywhere into the philosophy : all the more so since Hegel, in contrast to his disciples, did not parade ignorance, but was one of the finest intellects of all time. He was the first who attempted to show an evolution, and inner coherence in history; and while today much in his philosophy of History may seem peculiar to us, yet the grandeur of the basis of his basic outlook is admirable even today, whether one makes comparison with his precessors, or with anyone who, since his time has taken the liberty of reflecting in general concerning history....This epoch making conception of history was the direct theoretical prerequisite for the new materialist outlook, and thereby provided a connecting point for the logical method. (94)

The step Feuerbach did not take, the dynamic conception of man, Marx did take, as early as 1845 in The Holy Family. For man lives not only in Nature but also in human society, and this no less than nature has its history of development and its science. It was a question of bringing history into harmony with the materialistic foundation and of reconstructing it thereupon. He (Feuerbach) remained bound to the "metaphysical", or abstract notion of man.

Like the French materialists, Feuerbach taught that man was the product of circumstances and education, the product of existence acting upon consciousness. Thus man was considered as a part of nature formed mechanically by the action and influence of Nature around him. All his thoughts, his reactions were products of Nature. According to Feuerbach it seemed that man was purely a passive element, an obedient recipient of impulses supplied by Nature.

To this passivity Marx objected. Everything

that goes on within man, the changes of man himself, are the effects not only of the influence of nature upon man, but even more so of the reaction of man upon Nature. It is this that constitutes the evolution of man. Man reacted upon Nature and changed it, and in changing Nature he changed himself. (95)

Thus Marx introduced a revolutionary, active element into Feuerbach's passive materialism. It is the work of philosophy not only to explain the world, but to change it. Action is superior to contemplation, for contemplation by itself is sterile.

> The principal defect of past materialism (including that of Feuerbach) is that the opposition, the reality, the matter itself are considered under the form of object or intuition, and not as an activity of man himself. As praxis and not as subjectivity. That is why the activity is developped abstractly by idealism, in opposition to materialism, for idealism does not know real, sensible activity as such. Feuerbach wants to consider sensible objects as really distinct from thought; but he does not consider human activity itself as an objective activity.
> (Thesis I on Feuerbach, Marx)
>
> Philosophers have only interpreted the world in different ways; what remains is to change it.
> (Thesis XI on Feuerbach) (96)

The differences between the materialism of Feuerbach and that of Marx lie more within the field of social philosophy, than in the philosophy of nature, we shall not insist too strongly upon this difference. We can say that Marxism took its element of materialism from Feuerbach, for it was he who inverted the order of the Hegelian logic : he held that being determines thought, and not vice

versa. With proper qualifications this is not contrary to the principle of Marx, that "man determines nature", for Marx himself insists on the priority of the object over the thought of the object; and the human activity of which Marx says Feuerbach considered in an abstract way is truly an objective activity. In fact, Marx merely went further than Feuerbach, and applied the fundamental principle of materialism to a field that Feuerbach's spirit of traditionalism would not let him enter --- the field of historical materialism. "Backwards I agree with the materialists; but not forwards", was his way of stating his conservatism. (97)

The Dialectic of Nature : Karl Marx's contribution :

The Marxists considered the Dialectic of Hegel to be the one method that gave a most consistent explanation of the development of matter. Every other formulation up to this had been a non-sided, abstract view, lacking vitality, whereas matter in its real condition of existence was a moving force that could not be captured in abstract ideas. Though they professed to be outright materialists, the followers of the French classical school were abortive materialists, for they recognized matter only as a material cause. Matter is, however, completely sufficient to explain all becoming in the world, and so it possesses an intrinsic dynamism that makes it independent of all other motive forces. Substitute matter for the Being

of Hegel and you have the perfect formulation of dynamic materialism.

Though all the Marxists hold to the principle that matter is the only reality in the universe --- that so-called "spirit", or mind is but matter in its highest state of development --- nevertheless there is a qualitative difference between matter in its conscious state and matter in its condition of Nature apart from man. Can the Dialectic apply indifferently to these different states of matter ? or does Dialectic apply in its strict sense only to man and human society, and metaphorically to the rest of Nature ?

Sidney Hook raises the objection --- and it is a valid one --- firstly, that a Dialectic of Nature is impossible, and secondly then Karl Marx himself never taught a Dialectic of Nature, but only a Dialectic of Society, or of Man. The first part of this objection, which we also shall make, is considered in the analysis, in the latter part of this dissertation, of the Dialectic of Nature. Whether Marx himself held that Dialectic can be applied to Nature apart from man is by no means clear. There is evidence for and against this position.

In support of the opinion of the Marxists in general, that Karl Marx really did teach the application of Dialectical principles to non-conscious matter, we have the fact that in all their writing and in all their work, Engels and Marx were always in closest communication. And Engels certainly taught a Dialectic of Nature, as

withnessed by the Anti-Dühring, the Ludwig Feuerbach, and the book bearing the very name, Dialectics of Nature. Each of them not only read the other's manuscripts, but collaborated by means of suggestions and criticism in the very writing. There could hardly have been two men more close to each other, two men who understood each other as well as Marx and Engels --- the frequent visits and the enormous correspondence that passed between them, the mutual reliance one on the other, make it almost impossible to believe that Marx disagreed with Engel on the question of Dialectics of Nature. For Marx was no man to let personal feeling keep him from critizing a part of the theory upon which the workers' revolution was to be built, if that theory was recognized as false and potentially injurious to the cause.

Another bit of evidence in support of this opinion, is the unity of the Marxist doctrine. If Marxist materialism is a complete world outlook different from materialistic outlooks up to their time, then the Dialectic must run through its doctrine of Nature as well as through their teaching on society and history. Otherwise their philosophy of nature would not differ from that of the French materialistic school --- it is the dynamism of matter in the Marxist theory that sets it apart from the classical notion of matter, and this dynamism is nothing other than the Dialectic of Nature. Matter, according to a fundamental principle of Marxism, is in a constant development,

and man is but the highest state of this development. When Marx commended Descartes for speaking of matter as having a vital principle within itself, ("had invested matter with self-creative power and had conceived of mechanical motion as its vital act") (98), he was evidently speaking of non-conscious matter.

In the writings of Marx there is evidence that he held the validity of the Dialectical laws when applied to unconscious Nature. The Anti-Dühring whose first part is an exposition of the Dialectics of Nature is the joint work of Marx and Engels. And in several letters Marx says that there is at least a verification in nature of the Hegelian laws of Dialectic.

> During the past four weeks I have read all sorts of things. Among others Darwin's work on Natural Selection. And though it is written in the crude English style, this is the book which contains the basis in natural science for our own view. (99)
>
> Darwin's volume is very important and provides me with the basis in natural science for class struggle in history. (100)
>
> You will see from the conclusion of my third chapter that in the text I regard the law Hegel discovered as holding good both in history and in natural science. (101)

In a footnote in the Ludwig Feuerbach Engels says of the part Marx had in the formation of dialectical materialism :

> Here I may be permitted to make a personal explanation. Lately repreated reference has been made to my share in this theory (dialectical materialism), and so I can hardly avoid saying a few words here to settle this particular point. I cannot deny that both before and during my forty years' collaboration with

> Marx I had a certain independent share in laying the formulations, and more particularly in elaborating the theory. But the great part of its leading basic principles, particularly in the realm of economics and history, and above all, its final, clear formulation, belong to Marx. (102)

In the Anti-Dühring Engels says :

> Une remarque en passant : la conception exposée dans ce livre ayant, pour la part de beaucoup la plus grande, été fondée et développée par Marx, et pour la moindre part seulement par moi, il allait de soi que je n'écrivisse pas cet exposé à son insu. Je lui ai lu pour le deuxième chapitre de la partie consacrée à l'économie politique (sur l'histoire critique) il fut écrit par Marx : malheureusement je dus l'abréger un peu pour des raisons extrinsèques. C'était d'ailleurs de tout temps notre habitude de nous aider mutuellement dans des domaines que nous possédons spécialement. (103)

The last two quotations probably give us as accurate an indication as is possible to have on the problem. Marx and Engels were each specialists in a certain part of dialectical materialism. Marx concentrated on the economic and sociological and historical side, while Engels took the side of non-conscious Nature. Marx's writings are theoretical, it is true, but always have the practical aspect of immediate reference to the class struggle. Engels busied himself with mathematics and the experimental sciences, with the ideal of finding in nature a verification of the Dialectical laws. Except for the few references we have given, Marx never speaks of Dialectics of Nature.

We are inclined to agree, therefore, with Sidney Hook when he says that Marx did not teach a Dialectic of Nature. (104)

The few references we have given are not sufficient to constitute a doctrine, at least, a formulation of the doctrine. Most probably Marx was not especially interested in it, for there were more burning questions, more suited to his capacity as a polemical writer and economist, to take up his time. This part he left to his friend Engels. That Marx personnally held the same law of Dialectic to apply both in Nature and in society, we think there is sufficient evidence to assert, but this doctrine is not held with that full conviction that comes from having worked out and thought out the problem for himself --- it was more a belief based on the conviction of his collaborator.

Whatever be Marx's position, there can be no doubt that Frederich Engels and all Marxists who follow him (Plekanov, Lenin, Adoratsky, Stalin, as well as the lesser theorists) have taught and do teach a Dialectic of Nature. The dialectical movement of matter through conflict is a fundamental tenet that gives a rational explanation for their philosophy of man. For example: it rationalizes their doctrine of violent revolution; their fight against religion and their profession of atheism; their struggle for supremacy in the technical sciences. A doctrine which makes matter the sole reality and gives it an intrinsic principle of moement through conflict, leads to these conclusions of Marxism. Marxists, in general, look upon Historical materialism as the application in a higher field of those basic principles that govern all matter.

The laws of dialectics :

While in London in 1871 Engels started reading scientific books and journals on a large scale (he had long ago formed his interest along mathematical and scientific lines), with the intention of writing a great book "to show that in nature the same dialectical laws of movement are carried out in the confusion of its countless changes, as also govern the apparent contingency of events in history." Engels never completed this work. After Marx's death in 1883 he had the gigantic task of editing and completing Das Kapital, during which time he also wrote Ludwig Feuerbach and The Origin of the Family. The Manuscript of the Dialectics of Nature consisting of four bundles of notes all in Engel's handwriting, save for a number of quotations from the Greek philosophers in that of Marx, remained unedited until recently. An English translation was made by Clemens Dutt in 1940, and this was published by International Publishers, New York. Most of the manuscript seems to have been written between 1872 and 1882, and therefore the science will have the limitations of the science of that period. In addition to this book, the Anti-Duhring, part I, and the Ludwig Feuerbach, are the best source books available for the Dialectic of Nature. The Marxists who followed added very little either to the doctrine or to the examples of Engels, with Lenin making a few new applications of the dialectical laws to more modern science. It was Lenin, however, who really developed Marxist epistemology --- the Empirio-Criticism is a

complete exposition of Marxist doctrine of knowledge. After Lenin little progress in any way whatsoever was made, though the applications of the basic principles of Marxism have been varied to fit the needs of the times.

Engels considered the dialectical laws to be applicable to every field of knowledge, applicable to the objects known as well as the processes by which they are known. "The dialectic is nothing more than the science of the general laws of motion and development of nature, human society, and thought". The Dialectic is a constitutive principle in everything, a pervasive ontological character of everything that is or can be.

The laws of Dialectic, which in the philosophy of Hegel had been used to construct a logical world, must be turned right side up and applied to the real world, from which they had originally been drawn, though Hegel himself was unaware of it. These laws are valid because they have been drawn from the real world of movement; they are not the subjective construction of Hegel or of anyone else. Hegel had drawn many examples of Dialectic from the world of Nature, as well as from the science of mathematics and history, but he reversed the right order when he said that the dialectical laws were <u>confirmed</u> by these examples, instead of saying that these examples were the sources according to which the laws were <u>formulated</u>. Hegel's mistake lay in the fact that he considered the universe only as a product of

a definite stage of evolution in human thought, instead of being the reality which measures thought. Once this perverted order is corrected the dialectical laws that look so mysterious in the idealistic philosophy "at once become simple and clear as noonday". (105)

Modern experimental science has contributed to urge a new dialectical view of nature. Until the end of the 18th century or early part of the 19th, natural scientists could manage pretty well with the old abstract view of nature, because science had not progressed much beyond mechanics. High as the natural science of this period stood above the experimental science of the Greeks, it was inferior to the general philosophical view of the Greeks, who had already looked at Nature as a dialectical movement. (106) The science of the eighteenth century, which was the outgrowth of the mechanistic philosophy of Descartes, looked on the universe as a giant machine that never varied in its motion, because all the parts of it were bound by the immutable laws of mechanical motion. This mathematical view of the world did aid in the solution of many problems of physics, and it was "satisfying" --- because it gave the mind a feeling of certitude and immutability that is characteristic of mathematical sciences. But progress in the experimental sciences themselves showed that this was a false view of the world, for the world was really Heraclitean in character.

It was necessary to return to the point of view

of the great founders of Greek philosophy, to the view that the whole of nature, from the smallest element to the greatest, had its existence in eternal coming into being and passing away, in ceaseless flux, in unresting motion and change. (107) For the Greeks this was but a brilliant intuition; for modern science it was the result of strict scientific research.

> Thanks to the three great discoveries (108) and the other immense advances in natural science, we have now arrived at the point where we can demonstrate as as whole the inter-connection between the processes in nature not only in particular spheres but also in the inter-connection of these particular spheres themselves, and so can present in an approximately systematic form a comprehensive view of the inter-connection in nature by means of the facts provided by empirical natural science itself. To furnish this comprehensive view was formerly the task of so-called natural philosophy. It could do this only by putting in place of the real but as yet unknown inter-connection ideal and imaginary ones, filling out the missing facts by figments of the mind and bridging the actual gaps merely in imagination...Today, when one needs to comprehend the results of natural scientific investigation only dialectically, that is, in the sense of their own inter-connections in order to arrive at a "system of nature" sufficient for our time; when the dialectical character of this inter-connection is forcing itself against their will even into the metaphysically trained minds of the natural scientists, today this natural philosophy is finally disposed of. (109)

When we study nature in its objectivity as a real existing thing and not merely as an abstraction, when we make an introspection of our own character, when we consider history not in its isolated units but as a wave motion, we are struck, says Engels, by the infinity of actions and reactions that are found in each of them --- everything is in a continual state of flux : of development, of degeneration, of resurgence. The philosopher Heraclitus had already

known this unstable nature of everything in the world, but his general view did not permit us to grasp what was taking place in the individual parts that make up the universe. Now it is the duty of particular sciences to study these phenomena in detail. Up until the nineteenth century the method of study consisted in cutting up the phenomena into parts and then studying each part --- this was the method of abstract, metaphysical thinking. Through this method of analysis the phenomenon was classified according to certain forms that corresponded to the various divisions that had been made. This method had the disadvantage of separating the being from its environment, as well as cutting off the interaction of the parts of the being one on the other. Thus, the abstractive knowledge of reality took the being outside its real condition of existence, and thereby gave us a knowledge that was only partially correct. Phenomena that are essentially mobile can be correctly viewed only in their condition of mobility.

This first method of studying reality is called "metaphysical" or abstract, and the logic according to which it governs it concepts is called "formal" logic. The second method of study is "dialectical", and the logic according to which it governs its concepts is "Hegelian" or "concrete" logic. Needless to say, the latter is superior to the former, because it captures the being in its real, concrete existence --- Nature exists dialectically, not metaphyscially. (110) So argues Engels :

> Pour la dialectique...qui embrasse les choses et leurs copies dans l'intellect essentiellement dans leurs relations, leur enchainement, leur mouvement, leur naissance et leur fin, des phénomènes tels que ceux que nous avons décrits sont autant de confirmations de la méthode expérimentale qui lui est propre. La nature est la pierre d'essai de la dialectique, et il faut dire que les sciences modernes de la nature ont fourni pour cet essai des matériaux extrêmement riches et dont la masse augmente tous les jours, et qu'elles ont ainsi prouvé qu'en dernière instance la nature procède dialectiquement et non métaphysiquement. (111)

The basic laws of Nature are the same as the dialectical laws formulated in the Hegelian logic. The formulation varies among various Marxist writers, especially in regard to the Law of identity of opposites. And the order of the laws does not remain constant, so that we put down as the first law may be taken as the second law, and so on. We have followed what seems to us the logical order, the order of precedence of these laws.

These are the three laws : 1) The law of identity of contradictories. Sometimes alternate phrasings are found, such as : Law of identity of opposites; law of unity of opposites; law of unity of contradictories. 2) The law of negation of the negation. Sometimes this is called the law of the transformation of contradictions into each other. 3) The law of the transition of quantity into quality.

Law I : Identity of Opposites :

The fundamental presupposition of all the laws

of dialectics is the belief that contradiction is objectively present in all things and processes. According to traditional usage contradiction has been limited to propositions or judgements, and has not been considered applicable to things and events. In arguing against Dühring Engels tries to show that this has been the limitation of philosophy up to Hegel (making exception for the ancient Greeks who taught a dialectic of Nature), and the superiority of modern philosophy is precisely in making the contradictions objective.

The law of the identity of opposites is the recognition of the contradictory, mutually exclusive, opposite tendencies in all phenomena and processes of nature (as well as in society and in knowledge). (112)

It is true that as long as we consider things in a state of rest, or in a condition of abstraction, we do not meet with any intrinsic contradiction. We find in such a being certain properties, some of which are common with other beings, and some of which are peculiar to this individual. Considered independently, none of these properties is contradictory, for each of the properties is considered in an abstract condition where the mind attributes only one concept to each part. But it is entirely different if we consider the thing in its actual state of existence, in its relationship to other things and in the relationship of parts to each other. There we enter into a field where contradiction is the law.

The basis for this universal contradiction in Nature is the condition of instability or movement that all things in Nature is subject to. Movement itself is a contradiction, as the simple movement of local motion shows : for local motion is possible only because a body is in a certain place and is not in that place, (for it is in another place at the same time).(113) You cannot give a definitive answer to the question : Is a body which is in movement in this place or is it not ? You must answer yes and no.

Motion according to the Marxists cannot be expressed except by resorting to contradictory statements. This is evidence that motion itself is contradictory. The conclusion of Zeno was that there could be no motion --- the conclusion of Engels is that there is motion, and it is contradictory. (114)

Local motion is but one example of movement in Nature. There are other kinds of movement. Now it is the nature of matter which is at the base of all these different kinds of movement--- local motion, transmutation of energy, degeneration, and so on. All these illustrations but bring out the fundamental character of matter. Matter is self-contradictory, and therefore it is in constant motion. Though these forms of motion may have qualitative differences, they are all the same reality, matter, and therefore have ultimately the explanation of their movement in that which they basically are. Thus in the place of the idealistic "demiurgos" of Hegel, the idea, we have a

"demiurgos" (if we want to speak of one) intrinsic to matter and it is this which is the driving force of all movement.

If a simple change like mechanical motion already evidences the presence of contradiction, how much more so does a higher form of movement of matter, like organic life. Life is a contradiction that continually resolves itself, and when the contradiction ceases, life ceases.

> Si déjà le simple changement mécanique de lieu renferme en soi une contradiction, cela est encore bien plus vrai des formes supérieures de mouvement de la matière, et, tout particulièrement, de la vie organique et de son évolution. Nous avons vu plus haut que la vie consiste avant tout en ceci qu'un être est à chaque instant le même et cependant autre. La vie est donc également une contradiction "existant dans les choses et les phénomènes eux-mêmes", une contradiction qui constamment se pose et se résout; et dès que la contradiction cesse, la vie cesse aussi, la mort intervient. (115)

Engels conceives of the contradiction as really a struggle, in the sense that there is a struggle between opposing armies in a war, or as there is a struggle between the privileged and underprivileged class. This is not mere metaphor, for neither Marx nor Engels were given to the use of metaphor when they were laying the foundations for action. The fact that each part in this struggle has not yet reached the condition of consciousness and therefore act part enters the struggle blindly and of necessity, does not take away the real element of conflict. Matter in its lower states just as in its higher states is intrinsically contradictory, and consequently in constant

state of mobility. (116)

Matter moves in an eternal cycle completing its trajectory in a period so vast that in comparison with it our earthly year is as nothing. It moves in a cycle which has as the crowning point of its condition of organic life, what is called "self-consciousness". Thus mind is but the highest condition of the eternal movement of matter. In this eternal cycle every particular form of the existence of matter is verified --- be it the sun or a nebula, a particular animal or animal species, a chemical combination or decomposition ---. However long this cycle make take, and however many forms it may go through, we are certain that one thing will remain constant, and that is the Nature of matter. (117)

Another example of contradiction in the universe, and this runs through the whole universe, is the identification of chance and necessity. It seems that there cannot be anything more contradictory than these two, and it is the common sense judgement as well as that of metaphysical thinkers, that these two mutually exclude each other. In order to reduce all phenomena to necessity and thus make science possible, as they thought, the French materialists reduced all to absolute mechanical necessity. Every effect, they taught, can be reduced to its proper causes. That a peapod contains only five peas and that a dog's tail is five inches long and not a fraction of an inch longer, that a particular clover flower is fertilized by a particular

bee are all facts that can, according to the science based on mechanistic materialism, be produced only by an unchangeable concatenation of causes and effects.

This kind of necessity does not exist in the universe, Engels asserts. The reason there is only chance here, he says, is that it is absolutely impossible to retrace the causes that have led up to such an effect.

> There is no question of tracing the chain of causation in any of these cases; so we are just as wise in one as in another, the so-called necessity remains an empty phrase and with it --- chance also remains what it was before. As long as we are not able to show on what the number of peas in the pod depends, it remains just a matter of chance, and the assertion that the case was foreseen already in the primordial constitution of the solar system does not get us a step further....A science which sets itself the task of following back the casus (sic) of this individual peapod in its causal concatenation would no longer be science but pure trifling; for this same peapod alone has in addition innumerable other individual, accidental-seeming qualities: shade of colour, thickness, hardness of the pod, size of the peas, not to speak of the individual peculiarities revealed by the microscope. The one peapod, therefore, would already provide more causal connections for following up than all the botanists in the world could solve. (118)

Determination and chance are present simultaneously in the universe. Matter moves inexorably onward and upward according to firm and fixed laws, yet there is in each particular movement an element of chance. The very necessity which drives matter through its various forms is a blind necessity, for there is no such thing as finality or purpose in Nature --- since this latter would

entail either the existence of consciousness in all things in Nature, or the existence of some Mind apart from the world directing the movement of the universe towards some end.

This was the position, also, of Democritus, who taught that the movement of atoms, which resulted in diversity in the phenomenal world, was due to the universal law of gravity which affected the atoms according to their mass (making according to the opinion of that time the heavy atoms fall faster, and the lighter atoms more slowly). The various combinations of atoms that resulted from the vortex motion of atoms striking each other is due to their haphazard collisions with each other.

The laws of Nature are both objective and absolute, and to this extent the whole universe is subject to determination. Yet the individual phenomena which come about through the exercise of these laws can, as we have seen in a previous quotation from Engels, be attributed to chance, since it is utterly impossible to trace all the causal lines of even the tiniest reality in Nature.

> The general laws of motion --- both of the external world and of human thought --- (are) two sets of laws which are identical in substance but differ in their expression in so far as the human mind can apply them consciously, while in nature and also up to now for the most part in human history, these laws assert themselves unconsciously in the form of external necessity in the midst of an endless series of seeming accidents. (119)

When this same conflict between chance and

determination is found in its highest state of development, we have the identification of freedom and necessity. Free will and necessity, though, they as concepts are absolutely separate, are identified in the concrete human being. Freedom of will is nothing more than knowledge of the necessity of Nature. Consequently the more a man knows he is determined by necessity to do something, the more he can be said to be free. "For until we know a law of nature, which exists and acts independently outside our mind, we are the slaves of "blind necessity". But once we come to know this law, which acts (as Marx pointed out a thousand times) independently of our will and our mind, we become the lords of nature". (86)

> Hegel was the first to state correctly this relation between freedom and necessity. To him, freedom is the appreciation of necessity. 'Necessity is blind only in so far as it is not understood.' Freedom does not consist in the dream of independence of natural laws, but in the knowledge of these laws, and in the possibility this gives of systematically making them work, towards definite ends. This holds good in relation both to the laws of external nature and to those which govern the bodily and mental existence of men themselves --- two classes of laws which we can separate from each other at most only in thought but not in reality. Freedom of the will therefore means nothing but the capacity to make decisions with real knowledge of the subject. Therefore the freer a man's judgment is in relation to a definite question, with so much the greater necessity is the content of this judgment determined... Freedom therefore consists in the control over ourselves and over external nature which is founded on knowledge of natural necessity. (120)

Modern Marxist theorists have added some examples of the law of identity of opposites, examples that have been brought to light through the progression of science. These include

examples from further progress in physics, especially along the lines of the nature of electricity, and the construction of the atom. These phenomena are definitely dialectical, they say. And in physiology, the old example of Engels, the dialectical character of the sexes, has been explained more in detail to give a rational basis to certain laws of characteristics. Freud has shown that we can have no feeling of love towards anyone without simultaneously have a more or less suppressed feeling of hatred for the same person, and vice versa, and so, the Marxists find another verification of the universal law of identity of opposites.

This identity, it was already pointed out, does not exist in abstract concepts, but in the concrete. Abstract concepts are contradictory and always remain so, but these concepts give us only an imperfect knowledge of the real, for the intellectual process which abstracts these "ideas" is at the same time separating the real object into parts that cannot be separated in the real. For abstract concepts the Aristotelian logic is sufficient. When it is question of distinguishing these thoughts we can apply the rule : Yes is yes ; and no is no. This law is useful up to a certain degree, since science needs it for classification, and we need it in the ordinary activities of daily life, where we base our actions on relative truth rather than on the truth of the object as it is in itself. (121) Thus, a car is red though its color is fading, because that is the

color it was when it was bought, and there is no point in describing the exact shade of color between red and brown that is now on the car. Or we may say a person is not bald because he has more hair than an uncle who has no hair on the top of his head. Just when to call him bald or not bald is a practical question. Objectively the opposites are united, for a person who is going bald is both. (122)

But when we consider an object in movement we can no longer apply the rule of Aristotelian logic, for in a being in movement contradictories are united. And the principle of the logic now to be applied is : Yes is no; and no is yes. Matter in movement is a contradiction, and the truth of the fact can be expressed only in a logic that admits the simultaneous presence of contradictory elements.

Real matter and real movement (consequently) are present only in Nature. It is the science of Nature, therefore, that will primarily be interested in the laws of dialectics and in the new logic that governs our thoughts of movement. But modern mathematics, too, has seen the necessity of a dialectical viewpoint. Mathematical objects as such do not, of course, exist in the world of reality as mathematical. There all that exists is a real being independent of our mind's conceiving it or not. Mathematics is a science that rests within the limits of our mind in so far as all the

computations are concerned, and it has only a practical application to the world of Nature. A kind of movement in mathematics is admitted by the Marxists, together with all modern mathematicians, and to that extent the dialectical laws have reference to this science as well as to the science of Nature. Our primary interest is the Dialectics of Nature, and, so, we shall limit ourselves to that consideration in the text. In the appendix we give a summary of the Marxist doctrine of dialectics applied to mathematics. (123)

Consequences of the first law :

The first law of matter, the law of opposites, obviously has one important consequence: it established the autodynamic character of matter and dispenses with the need of an Cause external to matter itself to account for the motion evident in the world. It implication is that since matter possesses its own immanent principle of activity, no Mover extrinsic to the universe is needed --- a limitation of classical materialism. (124)

> Throughout the universe, development proceeds not as the result of any external cause (God), not because of any "purpose" inherent in events, but because of the inherent contradictions that are contained in all things and in all phenomena. "Contradiction is the root of all motion and of all life", Hegel wrote. "It is only because a thing contains a contradiction within itself, that is moves and acquires impulse and activity. This is the process of all motion and all development. (125)

II Law of Dialectics : Negation of the Negation.

The second and third laws of Marxist Dialectic are virtually contained in the first, since they are but determinations of the movement that is set up in the first law through the conflict of opposites. These last two laws define more specifically the direction of the movement of matter.

The law of negation of negation affirms that the negation, which started the movement of matter through the conflict that it caused, is itself negated in the synthesis. The synthesis is something positive. It is a return to the original thesis that was negated by the presence in the one and same real being of the contradictory of that which was first affirmed. For example, through the law of negation of negation, life which would be negated by its contradictory, death, would return again in the synthesis, for death itself would be negated in the movement. Thus, it could be generally stated that any progress can come only by way of negation. This principle is at the basis of Marxist doctrine of revolution --- there cannot be real progress except by overthrowing the existing condition. In the social order the Communist does not want merely an improvement of an imperfect situation; he wants the overthrow of the whole thing, for only in that way can any thing permanent be gained. As Marx himself affirmed many times, he did not want social legislation in Germany at a time when the communist

party looked forward to the rise of their social system there, for the reason that workers would become satisfied with their lot and no longer desire revolution. The capitalist state must be overthrown, not merely corrected. (126)

Through the negation of the negation the synthesis does not result only in a summation of the qualities of the two contradictories. The positive character that was negated returns on a higher level. The original qualities are enhanced. Compromise, which is but the union of the contradictory elements is an obstacle to the movement of matter, for it does not allow for real progress. Without negation there is no progress, no development.

The first law, the unity of opposites, represented the general relations of things from the point of view of structure; the second law represents the relation of things as a process, that is, dynamically. These two laws of nature permeate each other; they form a coherent whole ; the first gives a cross section of the world, while the second gives a longitudinal section. The second law is just as extensive as the first law, and therefore, applies to everything that is found within the limits of the law of opposition.

> Qu'est-ce donc que la négation de la négation ? Une loi du développement de la nature, de l'histoire et de la pensée, extrêmement générale, et, pour cette raison même, ayant l'extension et la portée les plus grandes; loi qui, nous l'avons vu, trouve son application dans le règne animal et végétal; en géologie, en mathématiques, en histoire, en philosophie, loi

à laquelle M. Dühring lui-même est bien obligé d'obéir à sa manière, sans le savoir, tout en se rebiffant récalcitrant. (127)

One example of the negation of the negation is the increase realized through planting seeds. The seeds are put in the ground under favorable conditions; they underdo a change in their form (this is the negation). But the result of this is the birth of plants in which the seeds are found once again in their original state (negation of the negation), but in great increase. Another example in the animal kingdom is the butterfly. It comes originally from an egg (which is changed as an egg); after the butterfly grows to sexual muturity, when the female lays a great number of eggs. Thus there is a return to the original, but with increase. Geology points out a series of negations of negations as each succeeding formation destroys the former to see it increased in the new. (128)

Neither the original negation, nor the negation of this can take place in a haphazard way, but must take place in each instance according to the nature of the thing that is in movement. Some negations result only in destruction, and not in progress. There must not only be a negation, but also a lifting up (aufheben) through a negation of the negation. The first must be such that the second negation can take place. A grain of barley is not going to reproduce if we destroy it by boiling it; nor is an insect going to reproduce