Section A

ANCIENT GREEK PHILOSOPHERS AND THEIR PHILOSOPHY

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CONTENTS

THE ORIGINS AND HISTORY OF WESTERN PHILOSOPHY

i. Introduction

It is believed that human beings have lived on this planet for some hundreds of thousands of years. The truth about the planet, and the people that may have lived during the first beginning may entirely not be known, but one thing that is sure is that people, who may have lived then, must have been driven by a desire to explain the world and the things or phenomenon around them.

Perhaps our earlier ancestors may have thought about how the world was formed and so many other important issues that may have bothered around their moral, ethical, and practical life. Whether they did or not, we have lost all forms of thoughts they must have engaged in the past. This is majorly attributed to the non existence of a mode through which events and things are recoded or documented. It was at the introduction of writing that records of events of our later ancestors have been recorded and documented.

One other important fact is that all around the globe there are different regions or the earth which have their own spectacular speculations about the world and all its associated questions of the things around and in it. The East and the West for instance are such examples of such regions of the world that has conjured their own speculations about the world and the cosmos. The continent of Africa is not left out. This section of our study shall be an account of one of such traditions or regions of the world, a region that is believed to have influenced greatly the thought and life pattern of other regions. This region In the words of Stumph, has come to be known as "the WESTERN REGION".

The story of western philosophy is believed to have started among the Greek islands and colonies that surround it during the sixth century B.C. (that is, Before the Common Era). The most puzzling issues among the thinkers then was "What are things really like?) . They also wondered "how the process of change in things took place?" These basic questions and many more were some of the kind of questions that they had to grapple with.

It may interest you to know that the explanations they offered to these questions became what was dubbed Philosophy,- the love of wisdom. The origin of all these speculations came from the realization that things are not really the way they appear or what they seem to present. The realization that appearance after all differed from reality, the phenomenon o f growth, birth, death and decay fully manifest in the coming into being and the passing away of life into death, was one puzzling issue that thinkers could not help but attempt to find answers to. For S. E Stumpf, "these facts raised sweeping questions of how things and people came into existence at different times, and pass out of existence only to be followed by other things and persons" [6]

Let me at this point note that the many answers given by the ancient thinkers in response to the bugging question of their time was not really considered as

important as the fact that they attempted to offer scientific answers in the first place, against the mythological answers that was initially the mode of thought at that time. A method that was typical of poets such as Homer and Hesoid who where known for using such supernatural means to explain natural phenomenon.

It is this singular mode of speculation that gave birth to a drastic shift in the mode of thought, i.e. mythical approach to natural approach which we find to be the most beneficial in this line of study. This is part of what we hope to study in this text.

ii. Milesian Philosophers

Athenian Empire

The birth place of philosophy is believed to be the sea port of Miletus located across the Agean Sea from Athens or the Western shores of Iona in the Asia Minor. It was because of this location that the first Greeks were called **"Ionians** or **Milesian.** [7] One other important point we need to make clear here is the fact that, around 585. B. C., Miletus (Sea Port) had become some sort of a trigonometric station or what you may want to call a Cross- read for both sea-born commerce and for cosmopolitan ideas. As such, this rich commercial environment created an atmosphere where people could relax and engage in such intellectual activity. It is also important to add that if it had not been for this above mention factors and for the fact that the people in this period naturally grew inquisitive about virtually everything, philosophy would not have thrived in the Milesian City.

As earlier mentioned in our introduction, the era before the 6th century B.C.E. was ridden with the mythical speculations of poets such as Homer and Hesoid who as Greek poets, offered mythical explanations to the order of things, with the Greek god Zeus being at the helm of affairs; who in the company of other lesser gods will manipulate with the affairs of men, women and nature. Details of these stories could be found in some of their books (works) "Iliad" and "Odyssey".

The account of the next three philosophers we are going to study is indeed an account of efforts to present a much more comprehensive, realistic and systematic account of the questions that puzzled them (the Greeks) in their time. The other questions tackled then include, "What are things really like?", "How can we explain the process of change"? "Can knowledge really be possible"? Etc.

The new outlook of tackling these questions thus represents an outright departure from the Homeric methods to a method more scientific in both principle and practice. At this point we will want to also note that this scientific method

was then mingled with Philosophy, as such, we won't be wrong if we call the primitive Milesian' Scientific. One other point we wish to highlight here is the fact that Greek Philosophy from the start was an intellectual activity. It was not just a matter of seeing or believing but of thinking. Philosophy in this regard meant thinking about basic and fundamental question with an attitude of genuine and free inquiry.

Before we conclude this section we want to highlight the truth that the advancement that we experience today wouldn't have been possible were it not for the giant strides that Thales and these other pre-socratic Philosophers we are about to study. They attempted to offer explanations and answerers to the fundamental questions of reality as expressed in their Metaphysics, Mathematics and Epistemology, even though we find their explanations some worth inappropriate when compared to the state of things in this present dispensation. We in studying these thinkers, shall take special care to critically analyze their thought pattern and the problems they encountered in their quest for knowledge & wisdom.

A. THALES [Thay-leez] (640-546 B. C. E.)

Records and tradition accords to Thales, a citizen of the wealthy Ionian Sea port town of Miletus, the honor of being the first western Philosopher. This invariably means that for the western world Philosophy began when Thales first began to consider whether there could be some fundamental kind of stuff out of which everything is made. Now today, we are so accustomed to the complex world we experience, as made up of the few basic substances (hydrogen, oxygen, carbon, and other elements) that we are so surprised that there was a time when people did not think these. Thus, we see that the thoughts and speculations of Thales started the ripples that emanated into the belief of the existence of the elements mentioned in the brackets, as the things which the world consist of. So, apart from giving credit to Thales for helping to introduce a new and an important idea into the western thoughts, he also deserve credit for helping to introduce a methodogical way of looking at the world

i. Life History (Profile)

We do not know much as we would have wanted to know about Thales. What we know now is anecdotal in nature. He left nothing in writing. All the information that we have on him is a collection of fragmentary references made about him by later philosophers; such as, Aristotle. In a passage of one of Aristotle's writings, Aristotle was found to have said the following:

> There is a story which is told of Thales of Miletus, it is a story about a scheme of making money, which is fathered on Thales, owing to his reputation for wisdom...He was reproached for his poverty which

> was supposed to show the uselessness of philosophy. But observing from his knowledge of metrology (as the story goes) that there was likely to be a heavy crop of olives (during the next summer)...with the money he had left on him, he went and acquired all the wine press in the land. When the bumper harvest came, any that must make wine in the land could only hire from Thales; who gave them at very high prices, thereby making so much money for himself. This he did just to show that philosophers; by virtue of their wisdom could be wealthy, if they so desired" [8] .

Thales was considered by many to be the wisest man of the ancient Greek world, but not by everyone. Once, when Thales was studying the stars it was recorded that, he got so carried away with it that he stumbled and fell into a Well of water, where he was found by a Thracian maiden, who was inclined to think that Thales may know much about the heavens, but was a bit dull when it came to knowing and seeing what was right before his very eyes.

But indeed Thales is not dull for Aristotle had called him the 'First Philosopher'. He was also known to have been a valued political advisor to the Lydian King's Army where he apparently solved the difficult logistical problems that enabled the King's Army to cross the wide Halys River. His solution was to dig a channel that diverted part of the flow, thereby making two narrower rivers over which bridges could be built.

He was known to have correctly predicted the eclipse of the sun which took place in May 28th 585 BCE. The records of a twentieth century philosopher, Bertrand Russell gives an account of when Thales was requested by the king of Egypt to determine the height of the pyramid, Thales simply did this by measuring the height of the shadow of the pyramid at the time of the day when his own shadow was equal to his own height. [9]

While also in Miletus Thales constructed an instrument for measuring the distance of ships sighted at sea, which also acts as an aid for navigating ships. To this regard, he urged sailors to use "the constellation little Bear" when sailing in the deep sea.

ii. Thales (Metaphysical) Postulations

When asked what is the most basic substance, Thales answered **"All things is Water"** Put simply, "All is water". This novel enquiry concerns the nature of things, for in those days the basic focus of every inquiry was geared towards finding what kind of stuff goes into the compositions of all things. With this question Thales was trying to account for the fact that there are many different kind of things, such as earth, clouds, and oceans. From time to time some of these things change into something else, and yet they still resemble each other in certain ways.

Thales' contribution to thought is his notion that, in spite of the differences between various things, there is nevertheless a basic similarity between them all. **"The many"** are related to each other by **"the one."** He thus assumed that some single element, some "stuff", a stuff which contained its own principle of action or change, that which lay at the foundation of physical reality. To him this one or this stuff is WATER.

If we stop and reflected upon Thales's idea, we will come close to understanding how Thales came to this conclusion that water is the cause of all things, Aristotle in his own reflections about Thales Postulations, came to the opinion that Thales must have derived it from the observation of simple events, perhaps from assuming that the nutriment of all things is moist, and that heat is generated from moist and kept alive by it. Aristotle continued, that Thales " got his notion from this fact and from the fact that the seed of all things have a moist nature and water is the origin of the nature of moist things. Other phenomenon such as evaporation or freezing also suggest that water takes on different forms.

So far we are guessing about Thales reasoning, in any case, Thales did come to the wrong conclusion with the water idea. But it was not Thales conclusion that was important- it was what Thales was up to. Thales attempted to explain the complex world that we see in terms of simpler underlying reality. Thus his question "what is the ultimate stuff"? set the stage for a new kind of inquiry, one that could be debated on its merits and could either be confirmed or refuted by further analysis. From this starting point we see other follows with alternative solutions to Thales question.

B. ANAXIMANDER [an-nex -im-AN-der] [610-546 BCE]

i. Introduction

Anaximander was the author of the first surviving lines of Western philosophy. He speculated and argued about 'the Boundless' as the origin of all that is. He also worked on the fields of what we now call geography and biology. Moreover, Anaximander was the first speculative astronomer. He originated the world-picture of the open universe, which replaced the closed universe of the celestial vault. [10]

Anaximander, a pupil of Thales and a younger contemporary of Thales maintained that the basic substance, of which everything comes, must be even more elementary than water and every other substance out of which we have knowledge. Water and other definite things he argued, are only specific variations or offshoots of something that is more primary. It may well be, he thought that we might find water or moisture in various forms everywhere. Water is only one specific thing among many other elements, and all these specific things need

some elementary stuff to account for their origin. The basic substance from which all these specific things come, he thought must be ageless, and indeterminate or of boundless realm. [11]

ii. Life and Sources

The history of written Greek philosophy starts with Anaximander of Miletus in Asia Minor, a fellow-citizen of Thales. He was the first who dared to write a treatise in prose, which has been called traditionally "On Nature". This book has been lost, although it probably was available in the library of the Lyceum at the times of Aristotle and his successor Theophrastus. It is said that Apollodorus, in the second century BCE, stumbled upon a copy of it, perhaps in the famous library of Alexandria. Recently, evidence has appeared that it was part of the collection of the library of Taormina in Sicily, where a fragment of a catalogue has been found, on which Anaximander's name can be read. Only one fragment of the book has come down to us, quoted by Simplicius (after Theophrastus), in the sixth century AD. It is perhaps the most famous and most discussed phrase in the history of philosophy.

We also know very little of Anaximander's life. He is said to have led a mission that founded a colony called Apollonia on the coast of the Black Sea. He also probably introduced the gnomon (a perpendicular sun-dial) into Greece and erected one in Sparta. So he seems to have been a much-traveled man, which is not astonishing, as the Milesians were known to be audacious sailors. It is also reported that he displayed solemn manners and wore pompous garments. Most of the information on Anaximander comes from Aristotle and his pupil Theophrastus, whose book on the history of philosophy was used, excerpted, and quoted by many other authors, the so-called doxographers, before it was lost. Sometimes, in these texts words or expressions appear that can with some certainty be ascribed to Anaximander himself. Relatively many testimonies, approximately one third of them, have to do with astronomical and cosmological questions. [12]

iii. His Philosophy / Principle "The Boundless"

According to Aristotle and Theophrastus the first Greek philosophers were looking for the 'origin' or 'principle' (the Greek word 'archê' has both meanings) of all things. Anaximander is said to have identified it with 'the Boundless' or 'the Unlimited' (Greek: *'apeiron', i.e.* 'that which has no boundaries'). Already in ancient times, it is complained that Anaximander did not explain what he meant by **'the Boundless'**. More recently, authors have disputed whether the Boundless should be interpreted as spatially or temporarily without limits, or perhaps as that which has no qualifications, or as that which is inexhaustible. Some scholars have even defended the meaning 'that which is not experienced', by relating the Greek word *'apeiron'* not to *'peras'* ('boundary', 'limit'), but to *'perao'* ('to experience',

'to apperceive'). The suggestion, however, is almost irresistible that Greek philosophy, by making **"the Boundless into the principle of all things"**, has started on a high level of abstraction. On the other hand, some have pointed out that this use of *'apeiron'* is typical of Greek thought, which was occupied with limit, symmetry and harmony. The Pythagoreans placed the boundless (the *'apeiron'*) on the list of negative things, and for Aristotle, too, perfection became aligned with limit (Greek: *'peras'*), and thus *'apeiron'* with imperfection. [13] Therefore, some authors suspect eastern (Iranian) influence on Anaximander's ideas.

iv. His Arguments regarding the Boundless

It seems that Anaximander not only put forward the thesis that the Boundless is the principle, but also tried to argue for it. We might say that he was the first who made use of philosophical arguments. Anaximander's arguments have come down to us in the disguise of Aristotelian jargon. Therefore, any reconstruction of the arguments used by the Milesian must remain conjectural. *Verbatim* reconstruction is of course impossible. Nevertheless, the data, provided they are handled with care, allow us to catch glimpses of what the arguments of Anaximander must have looked like. The important thing is, however, that he did not just utter apodictic statements, but also tried to give arguments. This is what makes him the first philosopher.

v. The Boundless has no Origin

Aristotle reports a curious argument, which probably goes back to Anaximander, in which it is argued that the Boundless has no origin, because it is itself the origin. We would say that it looks more like a string of associations and word-plays than like a formal argument. It runs as follows:

> *"Everything has an origin or is an origin. The Boundless has no origin. For then it would have a limit. Moreover, it is both unborn and immortal, being a kind of origin. For that which has become has also, necessarily, an end, and there is a termination to every process of destruction"* [14]

The Greeks were familiar with the idea of the immortal Homeric gods. Anaximander added two distinctive features to the concept of divinity: his Boundless is an impersonal something (or 'nature', the Greek word is *'phusis'*), and it is not only immortal but also unborn. However, perhaps not Anaximander, but Thales should be credited with this new idea. What is the divine? That which has no origin and no end"

vi. The Origin must be Boundless

Several sources give another argument which is somehow the other way round and answers the question of "why the origin should be boundless"?. In Aristotle's

version, it runs like this: "(The belief that there is something Boundless stems from when that from which is taken what has been generated, is boundless"). In this argument, the Boundless seems to be associated with an inexhaustible source. Obviously, it is taken for granted that "genesis and decay will never stop", and the Boundless has to guarantee the ongoing of the process, like an ever-floating fountain.

vii. The Origin of the Cosmos

The Boundless seems to have played a role in Anaximander's account of the origin of the cosmos. Its eternal movement is said to have caused the origin of the heavens. Elsewhere, it is said that "all the heavens and the worlds within them" have sprung from "some boundless nature"[15]. A part of this process is described in rather poetic language, full of images, which seems to be idiosyncratic for Anaximander: "a germ, pregnant with hot and cold, was separated [or: separated itself] off from the eternal, whereupon out of this germ a sphere of fire grew around the vapor that surrounds the earth, like a bark round a tree. Subsequently, the sphere of fire is said to have fallen apart into several rings, and this event was the origin of the sun, moon, and stars. There are authors who have, quite anachronistically, seen here a kind of foreshadowing of the Kant-Laplace theory of the origin of the solar system. Some sources even mention innumerable worlds (in time and/or in space), which looks like a plausible consequence of the Boundless as principle. But this is presumably a later theory, incorrectly read back into Anaximander.

viii. Astronomy

At first sight, the reports on Anaximander's astronomy look rather bizarre and obscure. Some authors even think that they are so confused that we should give up trying to offer a satisfying and coherent interpretation. The only way of understanding Anaximander's astronomical ideas, however, is to take them seriously and treat them as such, that is, as astronomical ideas. It will appear that many of the features of his universe that look strange at first sight make perfect sense on closer inspection.

We may discern three of his astronomical speculations: (1) that the celestial bodies make full circles and pass also beneath the earth, (2) that the earth floats free and unsupported in space, and (3) that the celestial bodies lie behind one another. (4) The order of the celestial bodies, (5) The celestial bodies as wheels. (6) The distances of the celestial bodies; (7) A representation of Anaximander's universe Notwithstanding their rather primitive outlook, these three propositions, which make up the core of Anaximander's astronomy, meant a tremendous jump forward and constitute the origin of our Western concept of the universe [16].

ix. Anaximander's Universe (The Map of the World)

Anaximander is said to have made the first map of the world. Although this map has been lost, we can imagine what it must have looked like, because Herodotus, who has seen such old maps, describes them. Anaximander's map must have been circular, like the top of his drum-shaped earth. The river Ocean surrounded it. The Mediterranean Sea was in the middle of the map, which was divided into two halves by a line that ran through Delphi, the world's navel. The northern half was called 'Europe', the southern half 'Asia'. The habitable world (Greek: 'oikoumenê') consisted of two relatively small strips of land to the north and south of the Mediterranean Sea (containing Spain, Italy, Greece, and Asia Minor on the one side, and Egypt and Libya on the other side), together with the lands to the east of the Mediterranean Sea: Palestine, Assyria, Persia, and Arabia. The lands to the north of this small 'habitable world' were the cold countries where mythical people lived. The lands to the south of it were the hot countries of the black burnt people. [17]

x. Biology

The doxography tells us that according to Anaximander life originated from the moisture that covered the earth before it was dried up by the sun. The first animals were a kind of fish, with a thorny skin (the Greek word is the same that was used for the metaphor 'the bark of a tree' in Anaximander's cosmology). Originally, men were generated from fishes and were fed in the manner of a viviparous shark. The reason for this is said to be that the human child needs long protection in order to survive. Some authors have, rather anachronistically, seen in these scattered statements a proto-evolutionist theory.

xi. Conclusion

It is no use trying to unify the information on Anaximander into one all-compassing and consistent whole. His work will always remain truncated, like the mutilated and decapitated statue that has been found at the market-place of Miletus and that bears his name. Nevertheless, by what we know of him, we may say that he was one of the greatest minds that ever lived. By speculating and arguing about the 'Boundless' he was the first metaphysician.

By drawing a map of the world he was the first geographer. But above all, by boldly speculating about the universe he broke with the ancient image of the celestial vault and became the discoverer of the Western world-picture.

C. Anaximenes (d. 528 BCE)

i. Introduction

Anaximenes Miletus (c. 585 BCc. 525 BC) was a Greek Pre-Socratic philosopher from the latter half of the 6th century, probably a younger contemporary of Anaximander, whose pupil or friend he is said to have been.[18]

According to the surviving sources on his life, Anaximenes flourished in the mid 6th century BCE and died around 528. He is the third philosopher of the Milesian School of philosophy, so named because like Thales and Anaximander, Anaximenes was an inhabitant of Miletus, in Ionia (ancient Greece). Theophrastus notes that Anaximenes was an associate, and possibly a student, of Anaximander's. [19]

Anaximenes is best known for his doctrine that air is the source of all things. In this way, he differed with his predecessors like Thales, who held that water is the source of all things, and Anaximander, who thought that all things came from an unspecified boundless stuff.

ii. Anaximenes Philosophy / Doctrine "On Air"

Anaximenes seems to have held that at one time everything was air. Air can be thought of as a kind of neutral stuff that is found everywhere, and is available to participate in physical processes. Natural forces constantly act on the air and transform it into other materials, which came together to form the organized world. In early Greek literature, air is associated with the soul (the breath of life) and Anaximenes may have thought of air as capable of directing its own development, as the soul controls the body. Accordingly, he ascribed to air divine attributes. [20]

iii. On The Doctrine Of Change

Given his doctrine that all things are composed of air, Anaximenes suggested an interesting qualitative account of natural change:

> *Air differs in essence in accordance with its rarity or density. When it is thinned it becomes fire, while when it is condensed it becomes wind, then cloud, when still more condensed it becomes water, then earth, then stones. Everything else comes from these.* [21]

Using two contrary processes of rarefaction and condensation, Anaximenes explains how air is part of a series of changes. Fire turns to air, air to wind, wind to cloud, cloud to water, water to earth and earth to stone. Matter can travel this path by being condensed or the reverse path from stones to fire by being successively more rarefied. Anaximenes provides a crude kind of empirical support by appealing to a simple experiment: if one blows on one's hand with the mouth relaxed, the air is hot; if one blows with pursed lips, the air is cold.

Hence, according to Anaximenes we see that rarity is correlated with heat (as in fire), and density with coldness, (as in the denser stuffs).

Anaximenes was the first recorded thinker who provided a theory of change and supported it with observation. [22] Anaximander had described a sequence of changes that a portion of the boundless underwent to form the different stuffs of the world, but he gave no scientific reason for changes, nor did he describe any mechanism by which they might come about. By contrast, Anaximenes uses a process familiar from everyday experience to account for material change. He also seems to have referred to the process of felting, by which wool is compressed to make felt. This industrial process provides a model of how one stuff can take on new properties when it is compacted.

iv. Origin of the Cosmos

Anaximenes, like Anaximander, gives an account of how our world came to be out of previously existing matter. According to Anaximenes, earth was formed from air by a felting process. It began as a flat disk. From evaporations from the earth, fiery bodies arose which came to be the heavenly bodies. The earth floats on a cushion of air. The heavenly bodies, or at least the sun and the moon, seem also be flat bodies that float on streams of air. On one account, the heavens are like a felt cap that turns around the head. The stars may be fixed to this surface like nails. In another account, the stars are like fiery leaves floating on air [23]. The sun does not travel under the earth but circles around it, and is hidden by the higher parts of the earth at night. Like Anaximander, Anaximenes uses his principles to account for various natural phenomena. Lightning and thunder result from wind breaking out of clouds; rainbows are the result of the rays of the sun falling on clouds; earthquakes are caused by the cracking of the earth when it dries out after being moistened by rains. He gives an essentially correct account of hail as frozen rainwater.

Most commentators, following Aristotle's understand Anaximenes' theory of change as presupposing material monism. According to this theory, there is only one substances, (in this case air) from which all existing things are composed. The several stuffs: wind, cloud, water, etc., are only modifications of the real substance that is always and everywhere present. There is no independent evidence to support this interpretation, which seems to require Aristotle's metaphysical concepts of form and matter, substratum and accident that are too advanced for this period. Anaximenes may have supposed that the 'stuffs' simply change into one another in order.

Anaximenes Influence on later Philosophy

Anaximenes' theory of successive change of matter by rarefaction and condensation was influential in later theories. It is developed by Heraclitus, and criticized by Parmenides. Anaximenes' general theory of how the materials of

the world arise is adopted by Anaxagoras [24], even though the latter has a very different theory of matter. and Plato (Timaeus 49b-c) see Anaximenes' theory as providing a common-sense explanation of change. Diogenes of Apollonia makes air the basis of his explicitly monistic theory. The Hippocratic treatise On Breaths uses air as the central concept in a theory of diseases. By providing cosmological accounts with a theory of change, Anaximenes separated them from the realm of mere speculation and made them, at least in conception, scientific theories capable of testing.

D. PYTHAGORAS (572-500) UNCERTAIN DATE

I. Introduction

Pythagoras of Samos also known as "Pythagoras the ***Samian***" was born between 580 and 572 BC, He died between 500 and 490 BC) was an Ionian Greek mathematician and founder of the religious movement called Pythagoreanism. He is often revered as a great mathematician, mystic and scientist; however some have questioned the scope of his contributions to mathematics and natural philosophy. Herodotus referred to him as "the most able philosopher among the Greeks". His name led him to be associated with *Pythian* Apollo; Aristippus explained his name by saying, "He spoke *(agor-)* the truth no less than did the *Pythian (Pyth-),*" and Iamblichus tells the story that the Pythia prophesied that his pregnant mother would give birth to a man supremely beautiful, wise, and beneficial to humankind.[25]

He is best known for the Pythagorean theorem, which bears his name. Known as "the father of numbers", Pythagoras made influential contributions to philosophy and religious teaching in the late 6th century BC. Because legend and obfuscation cloud his work even more than with the other pre-Socratics, one can say little with confidence about his life and teachings. We do know that Pythagoras and his students believed that everything was related to mathematics and that numbers were the ultimate reality and, through mathematics, everything could be predicted and measured in rhythmic patterns or cycles. According to Iamblichus of Chalcis, Pythagoras once said that "number is the ruler of forms and ideas and the cause of gods and daemons."

He was the first man to call himself a philosopher, or lover of wisdom,[26] and Pythagorean ideas exercised a marked influence on Plato. Unfortunately, very little is known about Pythagoras because none of his writings have survived. Many of the accomplishments credited to Pythagoras may actually have been accomplishments of his colleagues and successors.

ii. The Life of Pythagoras

Pythagoras was born on Samos, a Greek island in the eastern Aegean, off the coast of Asia Minor. He was born to *Pythais* (his mother, a native of Samos) and *Mnesarchus* (his father, a Phoenician merchant from Tyre). As a young man, he left his native city for Croton, Calabria, in Southern Italy, to escape the tyrannical government of Polycrates. According to *Iamblichus*, Thales, impressed with his abilities, advised Pythagoras to head to Memphis in Egypt and study with the priests there who were renowned for their wisdom. He was also discipled in the temples of Tyre and Byblos in Phoenicia. It may have been in Egypt where he learned some geometric principles which eventually inspired his formulation of the theorem that is now called by his name. This possible inspiration is presented as an extraordinaire problem in the Berlin Papyrus. Upon his migration from Samos to Croton, Calabria, Italy, Pythagoras established a secret religious society very similar to (and possibly influenced by) the earlier Orphic cult.

Pythagoras undertook a reform of the cultural life of Croton, urging the citizens to follow virtue and form an elite circle of followers around himself called **Pythagoreans**. Very strict rules of conduct governed this cultural center. He opened his school to both male and female students uniformly. Those who joined the inner circle of Pythagoras's society called themselves the *Mathematikoi*. They lived at the school, owned no personal possessions and were required to assume a mainly vegetarian diet (meat that could be sacrificed was allowed to be eaten). Other students who lived in neighboring areas were also permitted to attend Pythagoras's school. Known as *Akousmatikoi*, these students were permitted to eat meat and own personal belongings. Richard Blackmore, in his book *The Lay Monastery* (1714), saw in the religious observances of the Pythagoreans, "the first instance recorded in history of a monastic life."

According to *Iamblichus*, the Pythagoreans followed a structured life of religious teaching, common meals, exercise, reading and philosophical study. Music featured as an essential organizing factor of this life: the disciples would sing hymns to *Apollo* together regularly; they used the lyre to cure illness of the soul or body; poetry recitations occurred before and after sleep to aid the memory. Flavius Josephus, in his polemical *Against Apion*, in defense of *Judaism* against Greek philosophy, mentions that according to Hermippus of Smyrna, Pythagoras was familiar with Jewish beliefs, incorporating some of them in his own philosophy. Towards the end of his life he fled to Metapontum because of a plot against him and his followers by a noble of Croton named Cylon. He died in Metapontum around 90 years old from unknown causes.

Bertrand Russell, in A History of Western Philosophy, contended that the influence of Pythagoras on Plato and others was so great that he should be considered the most influential of all western philosophers.

iii. Pythagoreans

Life Style

> *The so-called Pythagoreans, who were the first to take up mathematics, not only advanced this subject, but saturated with it, they fancied that the principles of mathematics were the principles of all things.*
>
> *Aristotle, Metaphysics 1-5 , cc. 350 BC*

The organization was in some ways a school, in some ways a brotherhood, and in some ways a monastery. It was based upon the religious teachings of Pythagoras and was very secretive. At first, the school was highly concerned with the morality of society. Members were required to live ethically, love one another, share political beliefs, practice pacifism, and devote themselves to the mathematics of nature.

Pythagoras's followers were commonly called "Pythagoreans". They are generally accepted as philosophical mathematicians who had an influence on the beginning of axiomatic geometry, which after two hundred years of development was written down by Euclid in The Elements.

The Pythagoreans observed a rule of silence called echemythia, the breaking of which was punishable by death. This was because the Pythagoreans believed that a man's words were usually careless and misrepresented him and that when someone was "in doubt as to what he should say, he should always remain silent". Another rule that they had was to help a man "in raising a burden, but do not assist him in laying it down, for it is a great sin to encourage indolence", and they said "departing from your house, turn not back, for the furies will be your attendants"; this axiom reminded them that it was better to learn none of the truth about mathematics, God, and the universe at all than to learn a little without learning all. (*The Secret Teachings of All Ages* by Manly P. Hall).

In his biography of Pythagoras (written seven centuries after Pythagoras's time), Porphyry stated that this silence was "of no ordinary kind." The Pythagoreans were divided into an inner circle called the ***mathematikoi*** ("mathematicians") and an outer circle called the ***akousmatikoi*** ("listeners"). Porphyry wrote "the *mathematikoi* learned the more detailed and exactly elaborated version of this knowledge, the *akousmatikoi* (were) those who had heard only the summary headings of his (Pythagoras's) writings, without the more exact exposition." According to Iamblichus, the akousmatikoi were the exoteric disciples who listened to lectures that Pythagoras gave out loud from behind a veil.

The *akousmatikoi* were not allowed to see Pythagoras and they were not taught the inner secrets of the cult. Instead they were taught laws of behavior and morality in the form of cryptic, brief sayings that had hidden meanings. The

akousmatikoi recognized the *mathematikoi* as real Pythagoreans, but not vice versa. After the murder of a number of the *mathematikoi* by the cohorts of Cylon, a resentful disciple, the two groups split from each other entirely, with Pythagoras's wife **Theano** and their two daughters leading the *mathematikoi*.

Theano, daughter of the Orphic initiate Brontinus, was a mathematician in her own right. She is credited with having written treatises on mathematics, physics, medicine, and child psychology, although nothing of her writing survives. Her most important work is said to have been a treatise on the philosophical principle of the golden mean. In a time when women were usually considered property and relegated to the role of housekeeper or spouse, Pythagoras allowed women to function on equal terms in his society.[27]

The Pythagorean society is associated with prohibitions such as not to step over a crossbar, and not to eat beans. These rules seem like primitive superstition, similar to "walking under a ladder brings bad luck". The abusive epithet *mystikos logos* ("mystical speech") was hurled at Pythagoras even in ancient times to discredit him. The prohibition on beans could be linked to favism, which is relatively widespread around the Mediterranean.

The key here is that *akousmata* means "rules", so that the superstitious taboos primarily applied to the *akousmatikoi*, and many of the rules were probably invented after Pythagoras's death and independent from the *mathematikoi* (arguably the real preservers of the Pythagorean tradition). The *mathematikoi* placed greater emphasis on inner understanding than did the *akousmatikoi*, even to the extent of dispensing with certain rules and ritual practices. For the *mathematikoi*, being a Pythagorean was a question of innate quality and inner understanding.

There was also another way of dealing with the *akousmata* by allegorizing them. We have a few examples of this, one being Aristotle's explanations of them: "'step not over a balance', i.e. be not covetous; 'poke not the fire with a sword', i.e. do not vex with sharp words a man swollen with anger, 'eat not heart', i.e. do not vex yourself with grief," etc. We have evidence for Pythagoreans allegorizing in this way at least as far back as the early fifth century BC. This suggests that the strange sayings were riddles for the initiated.

The Pythagoreans are known for their theory of the transmigration of souls, and also for their theory that numbers constitute the true nature of things. They performed purification rites and followed and developed various rules of living which they believed would enable their soul to achieve a higher rank among the gods.

Much of their mysticism concerning the soul seem inseparable from the Orphic tradition. *The Orphics* advocated various purificatory rites and practices as well

as incubatory rites of descent into the underworld. Pythagoras is also closely linked with Pherecydes of Syros, the man ancient commentators tend to credit as the first Greek to teach a transmigration of souls. Ancient commentators agree that Pherekydes was Pythagoras's most intimate teacher. Pherekydes expounded his teaching on the soul in terms of a pentemychos ("five-nooks", or "five hidden cavities") the most likely origin of the Pythagorean use of the pentagram, used by them as a symbol of recognition among members and as a symbol of inner health *(ugieia)*.

iv. Musical Theories And Investigations

Pythagoras was very interested in music, and so were his followers. The Pythagoreans were musicians as well as mathematicians. Pythagoras wanted to improve the music of his day, which he believed was not harmonious enough and was too hectic.

According to legend, the way Pythagoras discovered that musical notes could be translated into mathematical equations was when one day he passed blacksmiths at work, and thought that the sounds emanating from their anvils being hit were beautiful and harmonious and decided that whatever scientific law caused this to happen must be mathematical and could be applied to music. He went to the blacksmiths to learn how this had happened by looking at their tools, he discovered that it was because the anvils were "simple ratios of each other, one was half the size of the first, another was 2/3 the size, and so on."

Investigations on Numbers

The Pythagoreans elaborated on a theory of numbers, the exact meaning of which is still debated among scholars. Pythagoras believed in something called the "harmony of the spheres." He believed that the planets and stars moved according to mathematical equations, which corresponded to musical notes and thus produced a symphony.[28]

The Pythagorean Theorem:

The sum of the areas of the two squares on the legs (a and b) equals the area of the square on the hypotenuse (c).

Since the fourth century AD, Pythagoras has commonly been given credit for discovering the Pythagorean theorem, a theorem in geometry that states that in a right-angled triangle the square of the hypotenuse (the side opposite the right angle), c, is equal to the sum of the squares of the other two sides, b and athat is, $a^2 + b^2 = c^2$.

While the theorem that now bears his name was known and previously utilized by the Babylonians and Indians, he, or his students, are often said to have constructed the first proof. It must, however, be stressed that the way in which the Babylonians handled Pythagorean numbers, implies that they knew that the

principle was generally applicable, and knew some kind of proof, which has not yet been found in the (still largely unpublished) cuneiform sources.[29] Because of the secretive nature of his school and the custom of its students to attribute everything to their teacher, there is no evidence that Pythagoras himself worked on or proved this theorem. For that matter, there is no evidence that he worked on any mathematical or meta-mathematical problems. Some attribute it as a carefully constructed myth by followers of Plato over two centuries after the death of Pythagoras, mainly to bolster the case for Platonic meta-physics, which resonate well with the ideas they attributed to Pythagoras. This attribution has stuck, down the centuries up to modern times.[30] The earliest known mention of Pythagoras's name in connection with the theorem occurred five centuries after his death, in the writings of Cicero and Plutarch.

Today, Pythagoras is revered as a prophet by the *Ahl al-Tawhid* or Druze faith along with his fellow Greek, Plato. But Pythagoras also had his critics, such as Heraclitus who said that "much learning does not teach wisdom; otherwise it would have taught Hesiod and Pythagoras, and again Xenophanes and Heraclitus".[31]

v. Religion and science

Pythagoras' religious and scientific views were, in his opinion, inseparably interconnected. Religiously, Pythagoras was a believer of metempsychosis. He believed in transmigration, or the reincarnation of the soul again and again into the bodies of humans, animals, or vegetables until it became moral. His ideas of reincarnation were influenced by ancient Greek religion. He was one of the first to propose that the thought processes and the soul were located in the brain and not the heart. He himself claimed to have lived four lives that he could remember in detail, and heard the cry of his dead friend in the bark of a dog.

One of Pythagoras' beliefs was that the essence of being is number. Thus, being relies on stability of all things that create the universe. Things like health relied on a stable proportion of elements; too much or too little of one thing causes an imbalance that makes a being unhealthy. Pythagoras viewed thinking as the calculating with the idea numbers. When combined with the Folk theories, the philosophy evolves into a belief that Knowledge of the essence of being can be found in the form of numbers. If this is taken a step further, one can say that because mathematics is an unseen essence, the essence of being is an unseen characteristic that can be encountered by the study of mathematics.

vi. Literary Works

No texts by Pythagoras survived, although forgeries under his name a few of which remain extant did circulate in antiquity. Critical ancient sources like Aristotle and Aristoxenus cast doubt on these writings. Ancient Pythagoreans usually quoted their master's doctrines with the phrase *autos ephe* ("he himself said")

emphasizing the essentially oral nature of his teaching. Pythagoras appears as a character in the last book of Ovid's *Metamorphoses*, where Ovid has him expound upon his philosophical viewpoints. Pythagoras has been quoted as saying, **"No man is free who cannot command himself."**

vii. Groups Influenced by Pythagoras

Influence on Plato

Pythagoras or in a broader sense, the Pythagoreans, allegedly exercised an important influence on the work of Plato. According to R. M. Hare, his influence consists of three points: a) the platonic Republic might be related to the idea of "a tightly organized community of like-minded thinkers", like the one established by Pythagoras in Croton. b) there is evidence that Plato possibly took from Pythagoras the idea that mathematics and, generally speaking, abstract thinking is a secure basis for philosophical thinking as well as "for substantial theses in science and morals". c) Plato and Pythagoras shared a "mystical approach to the soul and its place in the material world". It is probable that both have been influenced by Orphism.[32].

Plato's harmonics were clearly influenced by the work of Archytas, a genuine Pythagorean of the third generation, who made important contributions to geometry, reflected in Book VIII of Euclid's *Elements*.

Roman influence

In the legends of ancient Rome, *Numa Pompilius*, the second King of Rome, is said to have studied under Pythagoras. This is unlikely, since the commonly accepted dates for the two lives do not overlap.

Influence on esoteric groups

Pythagoras started a secret society called the Pythagorean brotherhood devoted to the study of mathematics. This had a great effect on future esoteric traditions, such as *Rosicrucianism* and *Freemasonry*, both of which were occult groups dedicated to the study of mathematics and both of which claimed to have evolved out of the Pythagorean brotherhood. The mystical and occult qualities of Pythagorean mathematics are discussed in a chapter of Manly P. Hall's *The Secret Teachings of All Ages* entitled "Pythagorean Mathematics".

Pythagorean theory was tremendously influential on later numerology, which was extremely popular throughout the Middle East in the ancient world. The 8th-century Muslim alchemist ***Jabir ibn Hayyan*** grounded his work in an elaborate numerology greatly influenced by Pythagorean theory.

E. HERACLITUS (535-475BCE)

"This world, which is the same for all, no one of gods or men has made. But it always was and will be: an ever-living fire, with measures of it kindling, and measures going out".
HERACLITUS...

i. Introduction And The Life History Of Heraclitus

Heraclitus of Ephesus (ca. 535-475 BC) was a pre-Socratic Greek philosopher, a native of Ephesus, Ionia, on the coast of Asia Minor. Heraclitus is known for his doctrine of change being central to the universe, and that the Logos is the fundamental order of all.

Heraclitus was ***born*** to an aristocratic family in Ephesus, present-day Efes, Turkey. His father was named either Blosôn or Herakôn. Diogenes says that he abdicated the kingship (basileia) in favor of his brother and Strabo confirms that there was a ruling family in Ephesus descended from the Ionian founder, Androclus, which still kept the title and could sit in the chief seat at the games, as well as a few other privileges.

About his *death*, Heraclitus' life as a philosopher was interrupted by a general edema and impairment of vision. The physicians he consulted were unable to prescribe a cure. He treated himself with a liniment of cow manure and baking in the sun, believing that this method would remove the fluid. After 24 hours of treatment he died and was interred in the marketplace

Of His Obscure Character: At some time in antiquity he acquired this epithet denoting that his major sayings were difficult to understand. Timon of Phlius calls him "the riddler" (ainiktçs) according to Diogenes Laërtius,[33] who had just explained that Heraclitus wrote his book "rather unclearly" (asaphesteron) so that only the "capable" should attempt it. By the time of Cicero he had become "the dark" (Ancient Greek Óêïôåéíùò *ho Skoteinós*[34]) because he had spoken nimis obscurç, "too obscurely", concerning nature and had done so deliberately in order to be misunderstood. The customary English translation of Óêïôåéíùò follows the Latin, **"the obscure."**

Diogenes Laërtius ascribes to Theophrastus the theory that Heraclitus did not complete some of his works because of melancholia. Later he was referred to as the "weeping philosopher", as opposed to Democritus, who is known as the "laughing philosopher".[35] If Stobaeus writes correctly, Sotion in the early 1st century AD was already combining the two in the imaginative duo of weeping and laughing philosophers: "Among the wise, instead of anger, Heraclitus was overtaken by tears, Democritus by laughter." The view is expressed by the satirist Juvenal:

> *The first of prayers, best known at all the temples, is mostly for riches.... Seeing this then do you not commend the one sage Democritus for laughing ... and the master of the other school Heraclitus for his tears?* [36]

As the naturalist Diogenes says that the book attributed to Heraclitus was On Nature (peri physeôs) Heraclitus' statement that "nature likes to hide" places him among those seeking the hidden nature of things, including those who were finding an explanation in substance.

Heraclitus had a rather different idea of the hidden nature than substance, but he was being called physicus at least as early as Cicero:

> *nemo physicus obscurus? ... valde Heraclitus obscurus ....*
> *no physicus was obscure? ... Heraclitus the obscure certainly was.*
> *If physis is nature, then physikos must translate to naturalist, but the term in English can have a great many meanings not necessarily implied by the ancient Greek.* [37]

On the education of Heraclitus, Diogenes says that Heraclitus was "marvelous" (thaumasios) from childhood, which is an implication of prodigy. Diogenes relates that Sotion said he was a "hearer" of Xenophanes, which seems to be paradoxical, as (so says Diogenes) he had taught himself by questioning himself. The word hearer implies that he was physically present at the speaking of Xenophanes in some capacity. English pupil or disciple have implications not in the Greek as to method, purpose and assent. Burnet states in any case that "... Xenophanes left Ionia before Herakleitos (Greek spelling) was born." Insufficient information survives to resolve the question.

Diogenes relates that as a boy Heraclitus had said he "knew nothing" but later claimed to "know everything." The Greek for "know" changes from the aorist, or indefinite past, to the perfect, which is a stative aspect: he was in a state of knowing as a result of some previous event. For the event he affirmed that he "heard no one" but "questioned himself." The implication is that man contains all knowledge within himself to be elicited by self-questioning, and yet he says: "The things that can be seen, heard and learned are what I prize the most" The self-examination then may only be a program of objective inquiry.

On Heraclitus character, Diogenes relates that Heraclitus had a poor opinion of human affairs. He believed that Hesiod and Pythagoras lacked understanding though learned and that Homer and Archilochus deserved to be beaten. Laws needed to be defended as though they were city walls. Timon is said to have called him a "mob-reviler" who did his reviling, either really or figuratively, in a voice as shrill as a cuckoo.

Diogenes quotes a letter from Darius inviting him to come to court to explain his writings and offering him rank and good company. Heraclitus refuses: with the following remark.

> *"All men upon earth hold aloof from truth and justice, while, by reason of wicked folly, they devote themselves to avarice and thirst for popularity."*[36]

No reaction of the king to these words has been recorded. Apparently the excuse that he had a "horror of splendour" and "was content with little" was accepted.

ii. Major Works

Diogenes says: "As to the work which passes as his, it is a continuous treatise *On Nature*, but is divided into three discourses, one on the universe, another on politics, and a third on theology." Theophrastus says (in Diogenes) "... some parts of his work are half-finished, while other parts make a strange medley."

Diogenes also tells us that he deposited his book as a dedication in the great temple of Artemis, the Artemisium, one of the largest temples of the 6th century BCE and one of the Seven Wonders of the Ancient World. Ancient temples were regularly used for storing treasures, and were open to private individuals under exceptional circumstances; furthermore, many subsequent philosophers in this period refer to the work. Says Kahn:[39] "Down to the time of Plutarch and Clement, if not later, the little book of Heraclitus was available in its original form to any reader who chose to seek it out." Diogenes says: "the book acquired such fame that it produced partisans of his philosophy who were called Heracliteans."

Unfortunately, as it was with other pre-Socratics, his writings only survive in fragments quoted by other authors.

iii. The *"Philosophy"* Of Heraclitus

1, Panta rhei, "everything is in a state of flux"

(panta rhei) "everything is in a state of flux" either was not spoken by Heraclitus or did not survive as a quotation of his. This famous aphorism used to characterize Heraclitus' thought comes from Simplicius.[40] The word rhei, adopted by rhe-o-logy, is simply the Greek word for "***to stream.***"[41]

The philosophy of Heraclitus is summed up in his cryptic utterance

> Potamoisi toisin autoisin embainousin, hetera kai hetera hudata epirrei
> "On those stepping into rivers the same, other and other waters flow."

The quote from Heraclitus is interpreted by Plato as

> Panta chôrei kai ouden menei

Instead of "flow" Plato uses chôrei, to change chôros, or ground, and not to "remain", with which menei is cognate. Just previously Plato explained:

> ta onta ienai te panta kai menein ouden
> "All beings going and remaining not at all"

At first thought Heraclitus might be supposed to be asserting nothing more profound or obscure than that we exist in a field or continuum in which everything is constantly in a sate of flux or process: a non-remarkable observation for such a famous philosophy. However, the assertions of flow are coupled in many fragments with the enigmatic river image:

> "We both step and do not step in the same rivers. We are and are not."

As a fellow Ionian, Heraclitus was certainly familiar with the preceding substance solution of the Milesian school to the problem of change. The problem only exists under the law of identity, one formulation of which is the law of excluded middle. The classical formulation of that law had to wait for Aristotle but it was nevertheless known and operant in pre-socratic philosophy.

In the fragment above Heraclitus is proposing that another law also is in effect. The law of identity states that an identity, say A, is identical to itself, is not non-A, and is not both A and non-A. Heraclitus affirms the middle in the passage above, that the A is both A and not-A. As far as the assertion is true, the change problem disappears and does not need a solution.

According to Diogenes' fragments: " it is possible to touch a mortal substance twice" and also in "The sun is ... not only new each day but forms continually new ...." the Heraclitean law only applies in cases where the identity is sampled diachronically. The sampling rate can be adjusted to as rapidly as an object can be touched, or to the rate of flow of the stream, or daily, or by extrapolation to the frequency at which a photon can be perceived. Heraclitus just said "continually" and theorized: "simultaneously it forms and dissolves.

It seems clear that the stream of the metaphor is time and that the stepping in it is the instant of the present. Heraclitus is therefore asserting that an object is and is not identical with itself of x instants ago.

1. Kalliste Harmonia, "The fairest Harmony"

Milesian philosophy was based on a binary law, which postulates a binary existence: objects either fully exist as completely identical to themselves or do not exist at all. There are two states, off or on. In Heraclitus the existence can be both off and on: a middle state of existing that is to some degree off and to some degree on.

The middle characteristic results from Heraclitus' existence being a derived quantity rather than a given one. It is the resultant of "simultaneous formation and dissolution" in the current instant, which explains such fragments as:

> *A, The way up and the way down are one and the same*
> *B, ... what is drawn together and what is drawn asunder ... The one is made up of all things and all things issue from the one.*
> *C, In the circumference of the circle, the beginning and the end are common.*
> *D, ... it (substance) approaches and departs.*
> *E , As for the resultant, it is a "harmony":*
>
> *ek tôn diapherontôn kallistçn harmonian*
> *"out of discord comes the fairest harmony."*

2. Hodos ano Kato, "the way up and the way down"

In the structure anô katô is more accurately translated as a hyphenated word: "the upward-downward path." They go on simultaneously and instantaneously (see previous section) and result in "hidden harmony". A way is a series of transformations which imply a chronological sequence no matter how closely spaced: the, "turnings of fire," first into sea, then half of sea to earth and half to rarefied air.

The transformation is a replacement of one element by another: "The death of fire is the birth of air, and the death of air is the birth of water;" moreover, the replacement is quantitatively determined, in which there appears to be a foreshadowing of conservation of mass: "Sea ... is measured by the same amount (logos) as before it became earth" or again: This world, which is the same for all, no one of gods or men has made. But it always was and will be: an ever-living fire, with measures of it kindling, and measures going out.

This latter phraseology is further elucidated: "All things are an interchange for fire, and fire for all things, just like goods for gold and gold for goods."

3 Dike Eris, "strife is justice"

If objects are new from moment to moment so that one can never touch the same object twice, then each object must dissolve and be generated continually momentarily and an object is a harmony between a building up and a tearing down. This is a foreshadowing of the scientific concept of equilibrium in many contexts. Heraclitus calls the oppositional processes eris, "strife", and hypothesizes that the apparently stable state, dikç, or "justice," is a harmony of it:

> *"We must know that war (polemos) is common to all and strife is justice, and that all things come into being through strife necessarily".*

As Diogenes explains: All things come into being by conflict of opposites, and the sum of things (ta hola, "the whole") flows like a stream.
In the bow metaphor Heraclitus compares the resultant to a strung bow held in shape by an equilibrium of the string tension and spring action of the bow:

> *"There is a harmony in the bending back (palintropos) as in the case of the bow and the lyre".*

Heraclitus here references the Scythian bow, the horns of which pointed forward unstrung but back strung, or the deformation of the cross-bar of the lyre under string tension. The palintropos of an object would therefore be its stinting from the growth of the current instant by the decay of the object of the previous. This identity-not-identity accounts for such statements as:
It is one and the same thing to be living and dead, awake or asleep, young or old.

A change is the result of a change in balance:

> *Cold things become warm, and what is warm cools; what is wet dries, and the parched is moistened.*

iv. Major Influence

Many philosophers have expressed the belief that they were influenced by Heraclitus, whether accurately or not. Some of the more notable ones are mentioned in this section;.. No doubt the thinkers before him may have influenced him in a lot of ways too.

Although Heraclitus is not known to have had students, his writings seem to have been influential from an early time. He may have provoked Parmenides to develop a contrasting philosophy (Patin 1899; Graham 2002), although their views have much more in common than is generally recognized Nehamas (2002). Empedocles seems to have invoked Heraclitean themes, and some Hippocratic treatises imitated Heraclitean language and presented applications of Heraclitean themes. Democritus echoed many of Heraclitus' ethical pronouncements in his own ethics. From an early time Heraclitus was seen as the representative of universal flux in contrast to Parmenides, the representative of universal stasis. Cratylus brought Heraclitus' philosophy to Athens, where Plato heard it. Plato seems to have used Heraclitus' theory (as interpreted by Cratylus) as a model for the sensible world, as he used Parmenides' theory for the intelligible world. As mentioned, both Plato and Aristotle viewed Heraclitus as violating the law of non-contradiction, and propounding an incoherent theory of knowledge based on a radical flux. Yet Aristotle also treated him as a coherent material monist who posited fire as an ultimate principle. The Stoics used Heraclitus' physics as the inspiration for their own, understanding him to advocate a periodic destruction of the world by fire, followed by a regeneration of the world; Cleanthes in particular

commented on Heraclitus. Aenesidemus interpreted Heraclitus as a kind of proto-skeptic Polito (2004).

Ever since Plato, Heraclitus has been seen as a philosopher of flux. The challenge in interpreting the philosopher of Ephesus has always been to find a coherent theory in his paradoxical utterances. Since Hegel, he has been seen as a paradigmatic process philosopherperhaps with some justification.
Other names worthy of mention here include: Plato, Aristotle, the stoics, the church fathers, Hegel, and Whitehead to mention but a few.

F. PARMENIDES [515 - ? BC]

For never shall this prevail, that things that are not are...
Parmemides

i. Introduction

Parmenides of Elea was an ancient Greek philosopher born in Elea, a Greek city on the southern coast of Italy. He was the founder of the *Eleatic* school of philosophy. The single known work of Parmenides is a poem which has survived only in fragmentary form. In this poem, Parmenides describes two views of reality. In *The Way of Truth* (a part of the poem), he explains how reality is one, change is impossible, and existence is timeless, uniform, and unchanging. In *The Way of Opinion*, he explains the world of appearances, which is false and deceitful. These thoughts strongly influenced Plato, and through him, the whole of western philosophy.

ii. Life

Parmenides was born in the Greek colony of Elea, which, according to Herodotus, had been founded shortly before 535 BCE. He was descended from a wealthy and illustrious family. His dates are uncertain; according to Diogenes Laërtius, he flourished just before 500 BCE, which would put his year of birth near 540 BCE, but Plato has him visiting Athens at the age of 65, when Socrates was a young man, c. 450 BCE,[42] which, if true, suggests a year of birth of 515 BCE. He was said to have been a pupil of Xenophanes,[43] and regardless of whether they actually knew each other, Xenophanes' philosophy is the most obvious influence on Parmenides.[44] Diogenes Laërtius also describes Parmenides as a disciple of "Aminias, son of Diochaites, the Pythagorean"; but there are no obvious Pythagorean elements in his thought. Parmenides was the founder of the School of Elea, which also included Zeno of Elea and Melissus of Samos. Of his life in Elea, it was said that he had written the laws of the city.[45] His most important pupil was Zeno, who according to Plato, was twenty-five years his junior, and

was his *eromenos*.[46] Parmenides' biggest influence was on Plato, who not only named a dialogue, *Parmenides*, after him, but always spoke of him with veneration.[47]

Overview

Parmenides is one of the most significant of the pre-Socratic philosophers.[48] His only known work, conventionally titled *On Nature*, is a poem, which has only survived in fragmentary form. Approximately 150 lines of the poem remain today; reportedly the original text had 3,000 lines. It is known, however, that the work originally divided into three parts:

- ***"A proem"*** which introduced the entire work,
- A section known as ***"The Way of Truth"*** (*aletheia*), and
- A section known as ***"The Way of Appearance/Opinion"*** (*doxa*).

The poem is a narrative sequence in which the narrator travels "beyond the beaten paths of mortal men" to receive a revelation from an unnamed goddess (generally thought to be Persephone or Dike) on the nature of reality. *Aletheia*, an estimated 90% of which has survived, and *doxa*, most of which no longer exists, are then presented as the spoken revelation of the goddess without any accompanying narrative.

Parmenides attempted to distinguish between the unity of nature and its variety, insisting in the *Way of Truth* upon the reality of its unity, which is therefore the object of knowledge, and upon the unreality of its variety, which is therefore the object, not of knowledge, but of opinion. In the *Way of Opinion* he propounded a theory of the world of seeming and its development, pointing out however that, in accordance with the principles already laid down, these cosmological speculations do not pretend to anything more than mere appearance.

Proem

In the *Proem* Parmenides describes his journey from darkness to light. Carried in a whirling chariot, and attended by the daughters of the Sun, he reaches a temple sacred to an unnamed goddess (variously identified by the commentators with Nature, Wisdom, or Themis), by whom the rest of the poem is spoken. He must learn all things, she tells him, both truth, which is certain, and human opinions; for, though one cannot rely on human opinions, they represent an aspect of the whole truth.

iii. The Way of Truth

The *Way of Truth* discusses that which is real, which contrasts in some way with the argument of the *Way of Opinion*, which discusses that which is illusory. Under the *Way of Truth*, Parmenides stated that there are two ways of inquiry: "**that it *is***", "**that it *is not***". He said that the latter argument is never feasible because nothing can *"not be"*.

For never shall this prevail, that things that are not, "are".

There are extremely delicate issues here. In the original Greek, the two ways are simply named "that Is" and "that Not-Is" without the "it" inserted in our English translation. In ancient Greek, which, like many languages in the world, does not always require the presence of a subject for a verb. "Is" functions as a grammatically complete sentence. A lot of debate has been focused on where and what the subject is. The simplest explanation as to why there is no subject here is that Parmenides wishes to express the simple, bare fact of existence in his mystical experience without the ordinary distinctions, just as the Latin "pluit" and the Greek *huei* mean "it rains"; there is no subject for these impersonal verbs because they express the simple fact of raining without specifying what is doing the raining. This is, for instance, Hermann Fraenkel's thesis *(Dichtung und Philosophie des fruehen Griechentums*, 1962) Many scholars still reject this explanation and have produced more complex metaphysical explanations. Since existence is an immediately intuited fact, non-existence is the wrong path because a thing cannot disappear, just as something cannot originate from nothing. In such mystical experience (*unio mystica*), however, the distinction between subject and object disappears along with the distinctions between objects, in addition to the fact that if nothing cannot be, it cannot be the object of thought either:

> *Thinking and the thought that it is are the same; for you will not find thought apart from what is, in relation to which it is uttered.*
> *For thought and being are the same.*
> *It is necessary to speak and to think what is; for being is, but nothing is not.*
> *Helplessness guides the wandering thought in their breasts; they are carried along deaf and blind alike, dazed, beasts without judgment, convinced that to be and not to be are the same and not the same, and that the road of all things is a backward-turning one.*

Iv. The Illusions Of Change

Thus, he concluded that "Is" could not have "come into being" because "nothing comes from nothing". Existence is necessarily eternal. Parmenides was not struggling to formulate the conservation of mass-energy; he was struggling with the metaphysics of change, which is still a relevant philosophical topic today. Moreover he argued that movement was impossible because it requires moving into "the void", and Parmenides identified "the void" with nothing, and therefore (by definition) it does not exist. That which does exist is ***"The Parmenidean One"***, which is timeless, uniform, and unchanging:

> *How could what is perish? How could it have come to be? For if it came into being, it is not; nor is it if ever it is going to be. Thus coming into being is extinguished, and destruction unknown.*
> *Nor was [it] once, nor will [it] be, since [it] is, now, all together, / One, continuous; for what coming-to-be of it will you seek? / In what way, whence, did [it] grow? Neither from what-is-not shall I allow / You to say or think; for it is not to be said or thought / That [it] is not. And what need could have impelled it to grow / Later or sooner, if it began from nothing? Thus [it] must either be completely or not at all.*
> *[What exists] is now, all at once, one and continuous... Nor is it divisible, since it is all alike; nor is there any more or less of it in one place which might prevent it from holding together, but all is full of what is.*
> *And it is all one to me / Where I am to begin; for I shall return there again.*

v. Erception Vs Logos. (The Illusions Of Sight)

Parmenides claimed that the truth cannot be known through sensory perception. Only pure reason (Logos) will result in the understanding of the truth of the world. This is because the perception of things or appearances (*the doxa*) is deceptive. We may see, for example, tables being made from wood and destroyed, and speak of birth and demise; this belongs to the superficial world of movement and change. But this genesis-and-destruction, as Parmenides emphasizes, is illusory, because the underlying material of which the table is made will still exist after its destruction. What exists must always exist. And we arrive at the knowledge of this underlying, static, and eternal reality *(aletheia)* through reasoning, not through sense-perception.

> *For this view, that That Which Is Not exists, can never predominate. You must debar your thought from this way of search, nor let ordinary experience in its variety force you along this way, (namely, that of allowing) the eye, sightless as it is, and the ear, full of sound, and the tongue, to rule; but (you must) judge by means of the Reason (Logos) the much-contested proof which is expounded by me.*

The Way of Opinion (doxa)

After the exposition of the *arche*, i.e. the origin, the necessary part of reality that is understood through reason or logos *(that [it] Is)* , in the next section, *the Way of Appearance/Opinion/Seeming*, Parmenides proceeds to explain the structure of the becoming cosmos (which is an illusion, of course) that comes from this origin.

The structure of the cosmos is a fundamental binary principle that governs the manifestations of all the particulars: "the aether fire of flame", which is gentle, mild, soft, thin and clear, and self-identical this is something like the masculine principle and the other is "ignorant night", body thick and heavy this is something like the feminine principle.

> *The mortals lay down and decided well to name two forms (i.e. the flaming light and obscure darkness of night), out of which it is necessary not to make one, and in this they are led astray.*

The structure of the cosmos then generated is recollected by Aetius,

> *Parmenides says that there are coronas's one enveloping or encircling another, one formed of rare, and the other of dense, others, mixed form of light and darkness, are in the middle. And Parmenides provides, surrounding all these, a [corona like a] wall of some kind, solid and just, under which is a corona of fire. And what is in the most center of all this [the core, kernel of the cosmos in the corona form] is again encircled by [a corona] of fire. And he provides the most middle [layer of corona] of the mixed coronas as the progenitor, for all beings, of all the movements and all the generations. He calls this [middle progenitor layer of corona] the goddess* (daimona) *that governs or that holds the key, or Justice* (dike) *or Necessity* (ananke).

vi. Interpretations Of Parmenides

The traditional interpretation of Parmenides' work is that he argued that the every-day perception of reality of the physical world (as described in *doxa*) is mistaken, and that the reality of the world is 'One Being' (as described in *aletheia*): an unchanging, ungenerated, indestructible whole. Under the *Way of Opinion*, Parmenides set out a contrasting but more conventional view of the world, thereby becoming an early exponent of the duality of appearance and reality. For him and his pupils, the phenomena of movement and change are simply appearances of a static, eternal reality.

Parmenides' philosophy is presented in the form of poetry. The philosophy he argued was, he says, given to him by a goddess, though the "mythological" details in Parmenides' poem do not bear any close correspondence to anything known from traditional Greek mythology:

> *Welcome, youth, who come attended by immortal charioteers and mares which bear you on your journey to our dwelling. For it is no evil fate that has set you to travel on this road, far from the beaten paths of men, but right and justice. It is meet that you learn all things - both the unshakable heart of well-rounded truth and the opinions of mortals in which there is not true belief.*

It is with respect to this religious/mystical context that recent generations of scholars such as Alexander P. Mourelatos, Charles H. Kahn, and the controversial Peter Kingsley have begun to call parts of the traditional, rational logical/philosophical interpretation of Parmenides into question (Kingsley in particular stating that Parmenides practiced *iatromancy*). It has been claimed that previous scholars placed too little emphasis on the apocalyptic context in which Parmenides frames his revelation. As a result, traditional interpretations have put Parmenidean philosophy into a more modern, metaphysical context to which it is not necessarily well suited, which has led to misunderstanding of the true meaning and intention of Parmenides' message. The obscurity and fragmentary state of the text, however, renders almost every claim that can be made about Parmenides extremely contentious, and the traditional interpretation has by no means been abandoned.

Parmenides' considerable influence on the thinking of Plato is undeniable, and in this respect Parmenides has influenced the whole history of Western philosophy, and is often seen as its grandfather. Even Plato himself, in the *Sophist*, refers to the work of "our Father Parmenides" as something to be taken very seriously and treated with respect. In the *Parmenides*, the Eleatic philosopher, which may well be Parmenides himself, and Socrates argue about dialectic. In the *Theaetetus*, Socrates says that Parmenides alone among the wise (Protagoras, Heraclitus, Empedocles, Epicharmus, and Homer) denied that everything is change and motion.

Parmenides is credited with a great deal of influence as the author of an "Eleatic challenge" that determined the course of subsequent philosophers' enquiries. For example, the ideas of Empedocles, Anaxagoras, Leucippus, and Democritus have been seen as in response to Parmenides' arguments and conclusions.[48]

vii. Zeno & Parmenides

Heraclitus maintained that everything changes, and since philosophers love to argue, it is perhaps unsurprising that someone stated the exact opposite, namely that nothing ever changes. This view was put forward by Parmenides, son of Pyres who came from Elea, a Greek foundation in southern Italy

It is further said that Parmenides and his main disciple, Zeno, once came to Athens for the festival of the Great Panathenaea where they had an encounter with the young Socrates. Although the narrative is uncertain, there is no doubt that Socrates, Plato, and Aristotle were strongly inspired by the Eleatic school. Zeno followed his master's advise to disarm his adversaries by leading their argument ad absurdum and thus became famous for his paradoxes. That the senses give us no clue to reality but only to appearance was proved by Zeno in the following manner (Zeno speaks to Protagoras, the sophist): "'Tell me, Protagoras,' he said, 'does one millet-seed - or the ten-thousandth part of a

millet-seed make a sound when it falls or not?' Protagoras said that it did not. 'But,' he said, 'does a bushel of millet-seed make a sound when it falls or not?' When he replied that a bushel does make a sound, Zeno said: 'Well, then, isn't there a ratio between the bushel of a millet-seed and the single seed - or the ten-thousandth part of a single seed?' He agreed. 'Well, then,' said Zeno, 'will there not be similar ratios between the sounds? For as the sounders so are the sounds. And if that is the case, then if the bushel of millet-seed makes a sound, the single seed and the ten-thousandth part of a single seed will also make a sound.' That was Zeno's argument." (Simplicius, Commentary on Physics, 1108.14-28) **To evince that motion and change is an illusion, Zeno presented the following paradoxes:**

1. The Racecourse. Imagine a racecourse of a given length, say 100m. The runner starts at the beginning of the racecourse and reaches the goal in a given time. In this example of motion, the runner traverses a series of units of distance, foot perhaps. Zeno holds, that each unit of distances can be divided into smaller distances, 1/2 foot, 1/4 foot, 1/8 foot and so on, until at last we have an infinite number of distances. How can the runner traverse an infinite number of distances in a finite amount of time?

2. Achilles and the Tortoise. The swift Achilles and the tortoise hold a race contest. Because Achilles is a sportsman, he gives the tortoise a head start. While the tortoise is already moving towards the goal, Achilles starts and pursues the tortoise. In a few seconds he reaches exactly the point, where the tortoise has been when Achilles started. However, during this time the tortoise has moved forward and it takes Achilles a certain amount of time to make up for this distance. Again, the tortoise has moved on in that time and Achilles needs another, smaller amount of time to make up for it. The distance between Achilles and the tortoise will always be divisible and, as in the case of the racecourse, no point can be reached before the previous point has been reached, thus Achilles can never overtake the tortoise.

3. The Arrow. Does the arrow move when the archer shoots it at the target? If there is a reality of space, the arrow must at all times occupy a particular position in space on its way to the target. But for an arrow to occupy a position in space that is equal to its length is precisely what is meant when one says that the arrow is at rest. Since the arrow must always occupy such a position on its trajectory which is equal to its length, the arrow must be always at rest. Therefore motion is an illusion.

There are more of Zeno's paradoxes; almost all involve dichotomy and the mathematical problem of infinity. Although these paradoxes are confusing, it is quite evident to us that the conclusions derived from them are nonsensical. Yet, this was not obvious to Zeno's contemporaries. In the early beginnings of

philosophy, these logical pitfalls presented a major obstacle to progressive thought, and Parmenides maintained a significant influence on Greek thought for some time.

The paradoxes illustrate the sort of problems we encounter in language and logic. Zeno's arguments are fallacious and may be refuted, once the correct premises are applied, yet the correct premises are less than obvious. Therefore, Parmenides and Zeno can be credited with having demonstrated, contrary to their intention, that logic alone is no sure-fire way to attain meaningful knowledge. They have instead shown that the opposite is occasionally true and that we must beware of logical pitfalls. Philosophical reasoning is only as sound as the premises it rests on.

viii. Influence On The Development Of Science

Parmenides made the ontological argument against nothingness, *essentially denying the possible existence of a void.* According to Aristotle, this led Leucippus to propose the atomic theory, which supposes that everything in the universe is either atoms or voids, specifically to contradict Parmenides' argument. Aristotle himself, proclaimed, in opposition to Leucippus, the dictum horror vacui or "nature abhors a vacuum". Aristotle reasoned that in a complete vacuum, motion would encounter no resistance, and thus infinite speed would be possible, something which Aristotle would not accept.

END

F. EMPEDOCLES (490430 BCE)

To the elements it came, from everything will return. Our bodies to earth, Our blood to water, Heat to fire, Breath to air.

Empedocles...

i. Introduction

Empedocles was a Greek pre-Socratic philosopher and a citizen of Agrigentum, a Greek colony in Sicily. Empedocles' philosophy is best known for being the origin of the cosmogenic theory of the four classical elements. He also proposed powers called Love and Strife which would act as forces to bring about the mixture and separation of the elements. These physical speculations were part of a history of the universe which also dealt with the origin and development of life. Influenced by the Pythagoreans, he supported the doctrine of reincarnation. Empedocles is generally considered the last Greek philosopher to record his ideas in verse. Some of his work still survives today, more so than in the case of

any other Presocratic philosopher. Empedocles' death was mythologized by ancient writers, and has been the subject of a number of literary treatments.

ii. Life Of Empedocles

Empedocles was born, c. 490 BC, at Agrigentum (Acragas) in Sicily to a distinguished family. Very little is known about his life. His father Meto seems to have been instrumental in overthrowing the tyrant of Agrigentum, presumably Thrasydaeus in 470 BC. Empedocles continued the democratic tradition of his house by helping to overthrow the succeeding oligarchic government. He is said to have been magnanimous in his support of the poor; severe in persecuting the overbearing conduct of the aristocrats; and he even declined the sovereignty of the city when it was offered to him.[50]

His brilliant oratory, his penetrating knowledge of nature, and the reputation of his marvellous powers, including the curing of diseases, and averting epidemics,[51] produced many myths and stories surrounding his name. He was said to have been a magician and controller of storms, and he himself, in his famous poem Purifications seems to have promised miraculous powers, including the destruction of evil, the curing of old age, and the controlling of wind and rain.

Empedocles was acquainted or connected by friendship with the physicians Acron and Pausanias, who was his eromenos; with various Pythagoreans; and even, it is said, with Parmenides and Anaxagoras. The only pupil of Empedocles who is mentioned is the sophist and rhetorician Gorgias.

Timaeus and Dicaearchus spoke of the journey of Empedocles to the Peloponnese, and of the admiration which was paid to him there; others mentioned his stay at Athens, and in the newly-founded colony of Thurii, 446 BC; there are also fanciful reports of him travelling far to the east to the lands of the Magi.

According to Aristotle, he died at the age of sixty, (c. 430 BC) even though other writers have him living up to the age of one hundred and nine.[52] Likewise, there are myths concerning his death; a tradition, which is traced to Heraclides Ponticus, represented him as having been removed from the earth; whereas others had him perishing in the flames of Mount Etna.[53]

iii. Works

Empedocles is considered the last Greek philosopher to write in verse and the surviving fragments of his teaching are from two poems, Purifications and On Nature. Empedocles was undoubtedly acquainted with the didactic poems of Xenophanes and Parmenides - allusions to the latter can be found in the fragments, - but he seems to have surpassed them in the animation and richness of his style, and in the clearness of his descriptions and diction. Aristotle called him the father of rhetoric, and, although he acknowledged only the meter as a

point of comparison between the poems of Empedocles and the epics of Homer, he described Empedocles as Homeric and powerful in his diction. Lucretius speaks of him with enthusiasm, and evidently viewed him as his model. The two poems together comprised 5000 lines. About 550 lines of his poetry survive, although because ancient writers rarely mentioned which poem they were quoting, it is not always certain to which poem the quotes belong. Some scholars now believe that there was only one poem, and that the *Purifications* merely formed the beginning of *On Nature*.[54]

1. Purifications

We possess only about 100 lines of his Purifications. It seems to have given a mythical account of the world which may, nevertheless, have been part of Empedocles' philosophical system. The first lines of the poem are preserved by Diogenes Laërtius:

It was probably this work which contained a story about souls, where we are told that there were once spirits who lived in a state of bliss, but having committed a crime (the nature of which is unknown) they were punished by being forced to become mortal beings, reincarnated from body to body. Humans, animals, and even plants are such spirits. The moral conduct recommended in the poem may allow us to become like gods again.

2. On Nature

There are about 450 lines of his poem On Nature extant, including 70 lines which have been reconstructed from some papyrus scraps known as the Strasbourg Papyrus. The poem originally consisted of 2000 lines of hexameter verse, and was addressed to Pausanias. It was this poem which outlined his philosophical system. In it, Empedocles explains not only the nature and history of the universe, including his theory of the four classical elements, but he describes theories on causation, perception, and thought, as well as explanations of terrestrial phenomena and biological processes.

iv. The Philosophy Of Empedocles

1. Love and Strife

The four elements are, however, simple, eternal, and unalterable, and as change is the consequence of their mixture and separation, it was also necessary to suppose the existence of moving powers - to bring about mixture and separation. The four elements are eternally brought into union, and eternally parted from each other, by two divine powers, Love and Strife. Love explains the attraction of different forms of matter, and Strife accounts for their separation.[55] If the elements are the content of the universe, then Love and Strife explain their variation and harmony. Love and Strife are attractive and repulsive forces which the ordinary eye can see working amongst people, but which really pervade the

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universe. They alternately hold empire over things, - neither, however, being ever quite absent.

2. The sphere of Empedocles

As the best and original state, there was a time when the pure elements and the two powers co-existed in a condition of rest and inertness in the form of a sphere. The elements existed together in their purity, without mixture and separation, and the uniting power of Love predominated in the sphere: the separating power of Strife guarded the extreme edges of the sphere.[57] Since that time, strife gained more sway and the bond which kept the pure elementary substances together in the sphere was dissolved. The elements became the world of phenomena we see today, full of contrasts and oppositions, operated on by both Love and Strife. The sphere being the embodiment of pure existence is the embodiment or representative of god. Empedocles assumed a cyclical universe whereby the elements return and prepare the formation of the sphere for the next period of the universe.

3. Perception and knowledge

Knowledge is explained by the principle that the elements in the things outside us are perceived by the corresponding elements in ourselves.[58] Like is known by like. The whole body is full of pores, (and hence respiration takes place over the whole frame). In the organs of sense these pores are specially adapted to receive the effluences which are continually rising from bodies around us; and in this way perception is explained.[59] Thus in vision, certain particles go forth from the eye to meet similar particles given forth from the object, and the resultant contact constitutes vision. Perception is not merely a passive reflection of external objects.

Empedocles noted the limitation and narrowness of human perceptions. We see only a part, but fancy that we have grasped the whole. But the senses cannot lead to truth; thought and reflection must look at the thing on every side. It is the business of a philosopher, while laying bare the fundamental difference of elements, to display the identity that exists between what seem unconnected parts of the universe.[60][61]

4. Reincarnation

Like Pythagoras, Empedocles believed in the transmigration of the soul, that souls can be reincarnated between humans, animals and even plants.[62] For Empedocles, all living things were on the same spiritual plane; plants and animals are links in a chain where humans are a link too. Empedocles urged a vegetarian lifestyle, since the bodies of animals are the dwelling places of punished souls. Wise people, who have learned the secret of life, are next to the divine, and their souls, free from the cycle of reincarnations are able to rest in happiness for eternity.[63]

v. Conlusion

I want to end this section by highlighting the significance of the work of Empedocles to the world of Greek philosophy and beyond.

Empedocles discovered a consistent way of affirming that change is possible while not under minding the fact that reality is fundamentally changeless. Empedocles agreed with Parmenides that being is uncreated and indestructible but rather that it simply is. This is represented in one of this poetic lines which reads thus: "from what in no wise exist, it is impossible for anything to come into existence (being) and for being to perish completely is incapable of fulfillment and unthinkable, for it will always be there wherever any one may place it on any occasion".

It is important to note that he did not quite agree with all of Parmenides positions. He Empedocles, did not agree that existence simply consist of "the one". This is because to accept the existence of one invariably means this denying of the reality of motion. Motion as a phenomenon for Empedocles was too great and obvious yet compelling a reality to deny. It was on the basis of this that Empedocles rejects this idea of "the one" as proposed by Parmenides. Now while agreeing with Parmenides that being is uncreated and indestructible, he nevertheless argued that being cannot qualify to be in the class of "the one" but rather he opined that this being belonged to the class of the many. It is all the things that belonged to this class, (the many) that are changeless and external. Empedocles in his analysis maintains that the objects that we see and experience daily do in fact come into being (existence) and are also destroyed. Thus for Empedocles, this phenomenon is possible because objects which go in and out of being (existence) are indeed composed of many material, particles. So although objects can change, as opined by Heraclitus, Empedocles maintains that this particles of which they are composed are changeless, a view Parmenides likens with the characteristic feature of "the one".

But when asked what these particles consist of, Empedocles held that these particles which indeed are subject to change and motion, contain four external material, elements namely Earth, Air, Fire and Water. From this position we can see that this idea is developed by the reinterpretation of Thales- Anaximenes, Philosophical theories.

Now these four elements, air, water, earth and fire for Empedocles, are changeless and eternal, and can thus not be transformed into something else. What we tend to perceive as change of motion is a manifestation or the product of the mixture of these four elements in a being, or substance. This idea is captured in a line of his poetry: "there is only a mingling and an interchange of what has been mingled". Earth, Air, Fire and Water, though they are unchangeable elements, mingled together to form objects, by this very nature, they make possible what we commonly experience as change.

The second part of Empedocles metaphysic that attempts an account for the phenomenon of change and permanence is seen in the assumption he made when he proposed that there are in nature two forces which he called LOVE and HATE. (Alternatively: he called them Harmony and discords.).There forces for him are responsible for the intermingling that takes place between these four elements which results in the coming together or the scattering of this substance in question.

The force of love causes elements to attract each other and build up into a particular form or person. On the contrary the force of hate brings about the decomposition of things. By this, the four elements rise together or separate from each other depending on how much love and hate that is manifested therein. He further divided the circle of change into (4) four stages. In the first stage, there is a predominance of the presence of love. Hate is entirely absent in this stage only love is responsible for the unifying harmony that exist. It is the state of the being. In stage two (2) the force of Hate is seen lurking nearby which in its nature starts to invade the peaceful state of things. But the prevailing pressure of love is overwhelming and does not allow for a total destruction. In the third (3) stage hate is seen to begin to predominate. This causes the eternal binding particle to breakdown and fall apart into discord. This ultimately brings about separation.
In this final stage, only Hate is present bringing about the desolation of all the four eternal elements, causing them therefore to assume their original state, ready to begin again a new cycle as the force of love returns to attract this element into another harmonious combination. This process for Empedocles is endless processes that continue ad-infinitum.

H. ANAXAGORAS (500-428 BCE)

i. Introduction

Anaxagoras (an- ak SAG-uh-rus) Anaxagoras, "lord of the assembly", c. 500 BC 428 BC) was a Pre-Socratic Greek philosopher famous for introducing the cosmological concept of Nous (mind), the ordering force

LIFE

Anaxagoras was known to have come from ELAZOMENAE, a coastal town in what is now known today as Turkey. Anaxagoras appears to have had some amount of property and prospects of political influence in his native town of Clazomenae in Asia Minor. However, he supposedly surrendered both of these out of a fear that they would hinder his search for knowledge. Although a Greek, he may have been a soldier of the Persian army when Clazomenae was suppressed during the Ionian Revolt.

in early manhood (c. 464461 BC) he went to Athens, which was rapidly becoming the centre of Greek culture. There he is said to have remained for thirty years. Pericles learned to love and admire him, and the poet Euripides derived from him an enthusiasm for science and humanity.

Anaxagoras brought philosophy and the spirit of scientific inquiry from Ionia to Athens. His observations of the celestial bodies and the fall of meteorites led him to form new theories of the universal order. He attempted to give a scientific account of eclipses, meteors, rainbows, and the sun, which he described as a mass of blazing metal, larger than the Peloponnese. The heavenly bodies, he asserted, were masses of stone torn from the earth and ignited by rapid rotation. However, these theories brought him into collision with the popular faith; Anaxagoras' views on such things as heavenly bodies were considered "dangerous."

About 450 Anaxagoras was arrested by Pericles' political opponents on a charge of contravening the established religion (some say the charge was one of Medism [34]. It took Pericles' power of persuasion to secure his release. Even so he was forced to retire from Athens to Lampsacus in Ionia (c. 434433 BC). He died there in around the year 428 BC. Citizens of Lampsacus erected an altar to Mind and Truth in his memory, and observed the anniversary of his death for many years.
Anaxagoras wrote a book of philosophy, but only fragments of the first part of this have survived, through preservation in work of Simplicius of Cilicia in the sixth century AD.

ii. Cosmological Theory

All things have existed from the beginning. But originally they existed in infinitesimally small fragments of themselves, endless in number and inextricably combined. All things existed in this mass, but in a confused and indistinguishable form. There were the seeds (spermata) or miniatures of wheat and flesh and gold in the primitive mixture; but these parts, of like nature with their wholes (the homoiomereiai of Aristotle), had to be eliminated from the complex mass before they could receive a definite name and character. Mind arranged the segregation of like from unlike; panta chremata en omou eita nous elthon auta diekosmese. This peculiar thing, called Mind (Nous), was no less illimitable than the chaotic mass, but, unlike the logos of Heraclitus, it stood pure and independent (mounos ef eoutou), a thing of finer texture, alike in all its manifestations and everywhere the same. This subtle agent, possessed of all knowledge and power, is especially seen ruling in all the forms of life.

Mind causes motion. It rotated the primitive mixture, starting in one corner or point, and gradually extended until it gave distinctness and reality to the aggregates of like parts, working something like a centrifuge, and eventually creating the known cosmos. But even after it had done its best, the original

intermixture of things was not wholly overcome. No one thing in the world is ever abruptly separated, as by the blow of an axe, from the rest of things.

It is noteworthy that Aristotle accuses Anaxagoras of failing to differentiate between nous and psyche, while Socrates (Plato, Phaedo) objects that his nous is merely a deus ex machina to which he refuses to attribute design and knowledge.

Anaxagoras proceeded to give some account of the stages in the process from original chaos to present arrangements. The division into cold mist and warm ether first broke the spell of confusion. With increasing cold, the former gave rise to water, earth and stones. The seeds of life which continued floating in the air were carried down with the rains and produced vegetation. Animals, including man, sprang from the warm and moist clay. If these things be so, then the evidence of the senses must be held in slight esteem. We seem to see things coming into being and passing from it; but reflection tells us that decease and growth only mean a new aggregation (sugkrisis) and disruption (diakrisis). Thus Anaxagoras distrusted the senses, and gave the preference to the conclusions of reflection. Thus he maintained that there must be blackness as well as whiteness in snow; how otherwise could it be turned into dark water?

Anaxagoras marked a turning-point in the history of philosophy. With him speculation passes from the colonies of Greece to settle at Athens. By the theory of minute constituents of things, and his emphasis on mechanical processes in the formation of order, he paved the way for the atomic theory. However, his enunciation of the order that comes from an intelligent mind suggested the theory that nature is the work of design

iii. Conclusion

In conclusion I will in the next set of lines highlight the salient contribution of Anaxagoras to the ancient Greek world and the world beyond.

His major philosophical contribution was his concept of "Mind" (nons) which he distinguished from matter. Anaxagoras agreed with Empedocles' that all coming into and going out of being consist merely in the mixture and separation of already existing substance. But he rejected Empedocles' ambiguous and somewhat mythical notion of love hate by which various objects supposedly form.

For Anaxagoras, the world and all its various objects were well ordered and intricately structured. There must then be some being with knowledge and power that organizes this material world in this flesh. It is this rational principle that Anaxagoras proposed his concept of mind, or nons.

According to Anaxagoras, the nature of reality is best understood as consisting of mind and matter. Before the existence of matter, Anaxagoras believed that matter existed as a mixture of various kinds of substances, all uncreated and imperishable. Like Empedocles, he believes that even when the original mass

of matter divided into actual objects, each part contains a part of every other element. "Thing" (spermatic, seed) this idea he exemplified: the snow which is all white in colour. Now he argues that because matter contain all other things in this case colours also contains some black colour but that this black colour cannot be seen because the snow contains a domineering mass of white colour which over shadows the black colour.

According to Anaxagoras, separation is the process that enables matter to be broken or separated into various things. This separation he opines is a function of the mind. The mind he believes produces a rotator motion which causes a rippling effect, which in turn spreads out so as to encompass more and more mass that contain all the (4) basic elements. This process of separation is continues. The results of this substance that are formed are those at a point in time where there is a predominance of a particular substance. So water is formed when the particles of water predominates. Nevertheless, the product formed still contains all other elements though in much more smaller proportions.

From this mixture process, Anaxagoras holds that during this process of separation and change, Nothing or none of the element succeeds totally to separate itself from the other except the Mind. It was from this premise that Anaxagoras deduced that mind is everywhere. In other words "mind is there where everything else is, in the surrounding mass".

Anaxagoras describes mind in such a way that he considered it as the moving or controlling force in the cosmos and in the human body. By this opinion, Anaxagoras limits the role of the mind; mind is certainly not the creator of matter since it held that matter is eternal. In all, we can say that Anaxagoras had imparted the world of philosophy in the sense that he was the first to attempt a differentiation of matter and mind, a field we latter see Descartes excelling in.

> *"He stated that mind is mixed with nothing while matter is a compendium of a lot of other elements and materials".*

Mind he said was the finest of all things and the purest, and it has all knowledge about everything and the greatest power.

Thus while matter is composite, mind is simple. He sees mind and matter though as always interrelated with each other. This further explains the quote. "Mind is there where everything else is". These concepts as proposed by Anaxagoras though not properly defined, we see, lay the foundation on which latter Greek philosophers were greatly influenced.

I. THE ATOMIST

Leucippus & Democritus, [Abdera, 460 - 370 BC]

i. Introduction

With the work of Leucippus and Democritus ancient Greek philosophy reaches its zenith when the initial question of Thales after the true nature of matter culminated 180 years later in the subtle concept of atoms, which bears an amazing resemblance to the twentieth century's view of chemistry. For this reason, Leucippus and Democritus have undoubtedly deserved the first price for the best guess in antiquity, as far as natural science is concerned. Unfortunately their contemporaries did not share their views with the same enthusiasm.

ii. Life & History

Leucippus is a very shadowy figure; his exact dates are unknown, some even say he never existed, but it is likely that he was a contemporary of Empedocles (around 440 BC) and that he came either from Miletus or from Elea. Democritus, who was a disciple of Leucippus, is a more certain figure. He was born 460 BC in Abdera in the north of Greece and died at the age of 90 years, after leaving an expansive work elaborating his philosophy including the atomistic theory in great detail.

He is said to have visited Egypt, Ethiopia, Persia, and India. Whether, in the course of his travels, he visited Athens or studied under Anaxagoras is uncertain. During some part of his life he was instructed in Pythagoreanism, and was a disciple of Leucippus. After several years of traveling, Democritus returned to Abdera, with no means of subsistence. His brother Damosis, however, took him in. According to the law of Abdera, whoever wasted his patrimony would be deprived of the rites of burial. Democritus, hoping to avoid this disgrace, gave public lectures. Petronius relates that he was acquainted with the virtues of herbs, plants, and stones, and that he spent his life in making experiments upon natural bodies. He acquired fame with his knowledge of natural phenomena, and predicted changes in the weather. He used this ability to make people believe that he could predict future events. They not only viewed him as something more than mortal, but even proposed to put him in control of their public affairs. He preferred a contemplative to an active life, and therefore declined these public honors and passed the remainder of his days in solitude.

Democritus has written approximately 70 books and hence overshadows his master by far. Unfortunately none of his writings remained intact, but a great deal of what he said has survived in Epicurus.

iii. Atomic Theory & Philosophy

The atomistic theory began as an endeavor to overcome the odd logical consequences of the Eleatic school. Leucippus and Democritus did not accept the Eleatic hypothesis that "everything is one" and that change and motion is an illusion. Parmenides had said the void is a fiction, because saying the void exists would mean to say there is something that is nothing, which he thought is a contradiction in itself, but he was deceived by thinking of "being" in the sense of "material being". Thinking of the void as real would have overthrown Parmenides' theory, because allowing the void to exist as "space bereft of body" (Aristotle) with adjoining plenums implies the opposite of classical monism.

Overthrowing monism was exactly what Leucippus and Democritus intended. They succeeded elegantly by inventing the concept of atoms, for which they are still known. Democritus began with stating a notion of space that served as its premise. Rather than an attribute of matter that describes its extension, Democritus characterizes space as a receptacle for stationary and moving objects, which -under certain circumstances- can as well be completely empty.

Twenty centuries later, Sir Isaac Newton had set forth the receptacle standpoint from where he developed his mechanics. He had a bitter controversy with Leibniz who held, on somewhat different grounds than Parmenides, that space is a system of relations. Today, we realize that both views about space were inaccurate because space can be without solid matter, but it always contains some form of radiation. We also know that the geometry of space is defined by mass, hence, the concept of space as a property of "what is" is closer to the understanding of contemporary physics, therefore Newton is likely to lose this argument today.

Leucippus and Democritus did not care to refute the Parmenidean paradox about the void, instead they simply ignored it, which proved to be useful, because it let them constructively explain motion and change. Change, they explained, is an observation that does not deceive the senses; change is real, it happens on account of the recombination of more rudimentary substances.

Previous Greek philosophers had already raised this point, but prior to the atomists none of them was able to provide a satisfactory explanation for what "substance" is. It was Leucippus' and Democritus' endeavor to develop a theory that would be consistent with sense perception and -by virtue of logical coherence- not contestable by the Parmenidean arguments.

They held that the nature of things consists of an infinite number of extremely small particles, which they called atoms. Atoms are physically, but not geometrically, indivisible. Democritus described atoms as being indestructible and completely full, i.e. containing no empty space. Because of their indestructibility, atoms are eternal. The notion of the atom itself as an "eternal oneness" may be interpreted as a concession to the Eleatic school.

According to the atomists, nature exists only of two things, namely atoms and the void that surrounds them. Leucippus and Democritus thought that there are many different kinds of atoms, each distinct in shape and size and that all atoms move around in space. Surprisingly they did not deem it necessary to give a reason for the motion of atoms, whereby they avoided the sort of logical mistakes that other philosophers had made. They denied that the motion of atoms is impelled in any way, instead they held that atoms move at random, like in the modern kinetic theory of gases. Democritus illustrated the movement of atoms with an observation he made in nature. He compared it to the movement of motes in a sunbeam when there is no wind.

The moving atoms inevitably collide in space, which in some cases causes them to be deflected like billiard balls, and in other cases, when the shapes of two atoms match in a way that they can interlock, causes them to build clusters upon collision, thereby forming substances which make up the objects of our perception. In this regard, Democritus' idea reveals an interesting parallel to Pythagoras, who said that all things are numbers. Because the characteristics of an atom can be described in numbers, any substance can be expressed as a combination of these numbers.

It is controversial whether the atomists also regarded weight a quality of atoms. It seems they simply neglected weight, although Democritus had mentioned that "the more any indivisible exceeds, the heavier it is". At this point, the atomists entered into what their predecessors had postulated to be the origin of matter, namely water (Thales), air (Anaximenses), fire (Heraclitus) and earth (Empedocles). They said, quite accurately as we know today, that these four elements are not primordial substances, but are composed of atoms like everything else.

Contemporary science has proven the atomists right. The atom concept finally took shape in 20th century's views of physics and chemistry. We know atoms as particles with a small positive nucleus that is surround by clouds of electrons and we know that the size of the entire structure is approximately 1/10,000,000 mm. Of course, the antique notion of atoms seems crude by comparison. The characteristics of being indivisible, indestructible, and massive, which had originally been ascribed atoms, cannot be upheld any longer. Today, we also have a better understanding of the internal structure of atoms, and we know that weight, or better mass, is a significant property of atoms.

Nonetheless, Leucippus and Democritus came closer to the truth than anyone else in the following millennium. They developed a fully mechanistic view of nature in which every material phenomenon is seen as a product of the atom collisions. Democritus' theory had no place for the notion of purpose and the intervention of gods in the workings of the world. He even held that mind and

soul is formed by the movement of atoms. In this regard, his attitude was genuinely materialistic.

Unsurprisingly these views earned Democritus harsh criticism. At a time when orphic beliefs and superstitions dominated the spiritual world, Democritus' atom theory seemed odd. People clung to the belief that their fate was steered by the gods of the Olympus. They were highly uncomfortable with the idea that everything, including human existence, is a product of mere atom collisions. Contemporaries and successors objected that the atomistic theory would leave everything to chance. Plato, for example, does not mention Democritus at all in his works. It is said that he disliked his ideas so much that he wished to see all of his books burned, although it is controversial whether these were his own words.

After Leucippus and Democritus, philosophy made a major turn towards ethics and politics. The atomists were the last in the line of true natural philosophers whose primary subject was the composition and order of the physical universe.

The Pre-Socratic period ended with Democritus. Athens had become the political, cultural and spiritual center of Greece, preparing the ground for the philosophical giants, Socrates, Plato, and Aristotle whose works outshone the atomists for many centuries. Yet, the atom theory remains one of the most amazing intellectual accomplishments of the antiquity.

END

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