3.1 GREECE: THE CRadle OF NATURALISM

That small and beautiful but rugged country which lies towards one corner of Europe bordering the Mediterranean sea has been rightly looked upon through ages as the home of human culture and civilization. It is this land of beauty and of Gods that we return to, when we wish to trace the origin of Philosophy, Education, Literature or Politics. Bailey (1928) contends that in all history, nothing is so surprising or so difficult to account for as the sudden rise of civilization in Greece. What they achieved in art and literature is familiar to everybody, but what they did in the purely intellectual realm is even more exceptional. They invented mathematics and science and philosophy, they first wrote history as opposed to mere annals, they speculated freely about the nature of the world and the ends of life, without being bound in the fetters of any inherited orthodoxy. What occurred was so astonishing that, until very recent times, men were content to gape and talk mystically about the Greek Genius.

Sambursky (1936) narrates that in a less primitive level of early Greek culture, the natural world was thought of as peopled with agents like ourselves, though more remote and larger, who "make things happen". The wind blew, they believed, because someone like themselves was puffing out his cheeks in the same way that they did when they blew. These agents tended to be wilful and unpredictable in their behaviour and there was nothing in this sort of explanation
to suggest that there are unchanging regularities and laws in Nature. The planteas, for example, which seemed to wander about the sky were simply travellers. Greece can thus fairly well lay claim to its being the cradle of all these arts and sciences. This claim for originality is by no means an empty boast for we find that it was here in Greece that Homer, the blind poet by writing out Iliad and Odyssey, the greatest epics of the world, laid deep the foundations of literature. Patrick (1935) maintains that the first scientific attempt to study the constitution of nature was made by the early Greek philosophers. Thales, who lived about 600 B.C. was the first to try his hand at it. With Thales (524-550 B.C.) originated the philosophical thought which was later perfected in all its depth and beauty by Plato (427-347 B.C.) and raised to the zenith of glory by Plato's great disciple, Aristotle (384-322 B.C.).

3.2 THE MILESIAN BEGINNINGS OF NATURAL PHILOSOPHY

Freeman (1950) describes that Miletus, in Asia Minor, was noted for its engineers and in Thales' time in the first quarter of the sixth century B.C. it was a flourishing cosmopolitan seaport, a centre of trade with Egypt, Greece and the Persian Empire. Burnet (1930) holds that it was at Miletus that the earliest school of scientific cosmology has its home and it is not, perhaps, without significance that Miletus is just the place where the continuity of Aegean and Ionian Civilisation is most clearly marked.

The Greek mind, once content to mythologize about reality, gradually grew restless and critical of myths, which could not be supported by empirical evidence. A new spirit,
more powerful than the mighty Achilles of old, began to travel on the wings of philosophy. We see the spirit, a stir in the Milesians of Ionia as they wondered about the manifold phenomena of stars and storms and seas and 'first philosophized about Nature'. Smith (1934) ascertains that early in Greece certain thinkers, particularly at Miletus, attempted to pick out the common identical elements from the various processes of Nature and thus to arrive at a universal first principle to which all changes and diversities could be referred. This led to the conception of a world-substance, something fundamental which persists throughout all change. Gruber (1961) explains that whatever their differences, the three Milesians—Thales (624–550 B.C.), Anaximander (611–547 B.C.) and Anaximenes (588–525 B.C.) believed the basic substance to be water, infinity or boundlessness, and air respectively. Because of their rational insights into reality, they are entitled to be called the first scientific cosmologists.

Wolff (1976) claims that they are little more than names to us today, but perhaps it is worth telling that we owe them, an intellectual debt almost too great to calculate. Martin, Clark, Clarke and Ruddick (1941) consider that in the minds of these milesians the happenings of the visible world around them aroused a new sort of curiosity, and the scientific attitude toward nature therewith began to take shape. The orderly procession in the heavens of the sun, moon and stars, such other striking phenomena as eclipses, rainbows, lightning, storms and
Weather changes generally, as well as the regularly recurrent processes of birth, growth and death in plants, animals, and men alike—these things challenged a more reflective inquiry into their causes. Hitherto these aspects of nature had been dealt with by myth-makers and poets who with facile imagination had interpreted them as manifestations of the supernatural agency of the gods.

Edel (1946) believes that what especially sets these three Milesians apart from their predecessors—the poets and theologians—in their contemplation of their world is just this: forsaking such charming and picturesque storytelling and history, they endeavoured to interpret nature's processes as natural events and to discover for them natural (rather than super-natural) cause, their explanations of lightning and rainbows, of the courses of the stars, of the biological cycle of birth and death—crude guesswork that they inevitably were in that early dawn of scientific knowledge—would for themselves scarcely be remembered to-day.

But this theorizing of astronomical, physical, and biological phenomena gave rise in the minds of Thales and his successors more ambitious and still more audacious conceptions about the nature of the Universe as a whole. About the all in existence, these latter speculations inaugurate a vastly significant movement in natural philosophy. It is the Milesian philosophy of nature rather than the details of their scientific hypotheses with which the history of philosophy is properly concerned.

3.2.1

THALES (624 - 540 B.C.)

Fuller and McMurrian (1955) remark that Thales
was the founder of the Milesian school and the father of Western philosophy. Born at Miletus in the last of the seventh century B.C., he was a statesman of great wisdom and vision, a successful business-man who is said to have established a monopoly in olive oil, and a mathematician and astronomer of note in his day as well as the first European philosopher. Copleston (1946) depicts that the mixture of philosopher and practical scientist is seen very clearly in the case of Thales of Miletus. Hicks (1925) states that his statue is said to bear this inscription:

"Pride of Miletus and Ionian lands,
Wisest astronomer, here Thales stands."

Furley and Allen (1970) point out that Thales' teaching stems from Egypt. If one collects the mentions of Thales, there is much evidence that he does indeed owe this inspiration to Egypt. Tomlin (1932) ascertains that of Thales of Miletus, who lived about 600 B.C., we knew no more than that he was the first investigator of the natural world to have worked out a coherent, if elementary, science of matter. His chief claim to fame is his assertion that the immense variety of the natural world ultimately sprang from one element or principle. Now the element from which everything else originated was according to Thales, water. Water is that which envelops the earth. And the earth, in fact, may be said to float upon an ocean infinite in extent.

Ferm (1961) contends that Thales is also credited with the discovery of several theorems of geometry. Martin, Clark, Clarke and Ruddick (1941) maintain that
perhaps the best attested fact about Thales is that he predicted an eclipse of the Sun which was visible in Asia Minor in 585 B.C. This prediction was presumably based upon certain astronomical records and rules of calculation used by the Babylonian astronomers. Gomov (1940) also recalls that Thales predicted an eclipse of the Sun, which stopped a battle when it occurred on May 23, 585 B.C. He is said to have measured the heights of the Egyptian pyramids by their shadows and devised a method for measuring the distance from the shore to ships at sea. Wasserstein (1934) expresses that Thales is also said to have re-directed the course of the river Halys for Croesus.

Jones (1952) claims that as a matter of fact, Thales taught that all things are made of water and we may imagine reasons that might have convinced him. One, no doubt, would be that water is known as a liquid, a solid, and a gas; and these various forms seem to suggest that water is capable of all the transformations, a universal substratum must undergo if it is to produce the objects of our world. Since, too, a general theory must attempt to explain biological phenomena as well as physics and astronomy. Another reason for selecting water might have been its indispensability to life.

ANAXIMANDER (611 - 547 B.C.)

Burgess (1939) states that the second member of the Milesian school appears to have possessed talents of his own along scientific lines. It being held that he invented a sundial and was the first occidental map-maker. He was Anaximander, pupil of Thales, who pronounced the
of the universe to be the Boundless. His conception of the world is the prototype of Greek view of nature as a cosmos, a harmonious realm within which the waxing and waning of the elemental powers march in step with the astronomical cycles. All later Greek formulas for the cosmos must accordingly be understood as the developments or modifications of this Milesian view, and in so far as our own conception of the laws of nature is derived from that of Greeks, its origins can be traced back to Anaximander. Heidel (1937) explains that Anaximander's introduction of models into the study of astronomy and geography was no less crucial step in the development of science. Anaximander tried to build objects that would reproduce the same operation or relations as the things he was studying, but on a different scale or size. One result was a pair of maps: one of the earth, the other of the stars.

Durant (1926) pleads that Anaximander, the first Greek to make astronomical and geographical charts, believed that the Universe had begun as an undifferentiated mass, from which all things have arisen by the separation of opposites; that astronomic history periodically repeated itself in the evolution and dissolution of an infinite number of worlds; that earth was at rest in space. These charts were either painted on wood or worked in bronze. They are of course lost but by a lucky coincidence we possess one of their Mesopotamian counterparts inscribed in a more durable medium. There is in the British Museum a clay tablet of Neo-Babylonian or Persian date, on which is plainly visible the outline of the earth, surrounded by the
"Bitter River" or "Salty Ocean." The circumference of the Earth and the Ocean are here represented as perfect circles, and there is even a small, deep hole in the centre of the chart which was probably left by the Scribe's Compass.

Sullivan (1970) recalls that Anaximander supposed the earth to be a disc in the centre of this world, surrounded by rings of hallow pipe (a modern stove pipe gives the right idea) of different sizes and different speeds of rotation. Each pipe is full of fire but the pipe is made of a hard shell or bark (phleion) which keeps the fire inside except at certain openings (breathing holes, from which the fire escapes as though blown by a blacksmith's bellows). These openings are what we see as the sun, moon, and planets moving across the sky as the circles turn: These are the causes of eclipses which occur when they hide the openings of the pipes from our view. The whole system has a daily revolution but in addition each wheel has a proper motion of its own.

Hicks (1925) narrates that Anaximander was the first inventor of gnomon and set it up for a sundial. He also constructed clocks to tell the time. In the words of Frost (1959) Anaximander holds that the basic substance of the Universe was The Infinite. But he endowed this substance with eternal motion, in order to explain how the Universe as he saw it, and as his fellows saw it, came into being. Burnet (1930) ascertains that Anaximander taught, then, that there was an eternal, indestructible something out of which everything arises and into which everything returns; a boundless
stock from which the waste of existence is continually made good. That is only the natural development of the thought we have ascribed to Thales and there can be no doubt that Anaximander at least formulated it distinctly.

What Anaximander and his fellows brought into being is nothing less than the science and the natural philosophy of antiquity. Kahn (1960) depicts that this presentation of natural science as a kind of epic poem, with beginning, middle and end is characteristic of early Greek thought. Anaximander also contributed a theory of evolution strikingly close to the Darwinian hypothesis, for he attributed organic life to the action of fluid in drying up sufficiently to form fish like creatures which developed into animals through a process of adopting themselves to life on land. The human species was the end result of this process of adoption.

Saahian (1965) describes that finally, Anaximander formulated a theory on the transmigration of soul. According to his theory (which appears to have been quite similar to the Hindu point of view) cosmic matter creates itself, disintegrates and then recreates itself, in a perpetual life process of never ending transformations. Camov (1940) concludes that Anaximander was at once astronomer and geographer, genealogist, meteorologist, biologist, anthropologist and historian.

J.2.3

Anaximenes (585-525 B.C.)

Brumbaugh (1964) contends that Anaximenes was a pupil, associate, and successor of Anaximander. Nothing is known about his life. In contrast to the poetic prose of Anaximander he wrote simply and unaffectedly. Unfortunately,
only one sentence of his writings has survived. Seeing something of value in the insights of his predecessors Anaximenes synthesized the conceptions of Anaximandroean unlimitedness and Thalesian specific boundless principle—air a vital material cause which is preferable to water because of its greater mobility and extension. According to Fuller and McSorley (1933) all animate things were dependent on the air for life and Anaximenes extended this dependence to the whole universe. As our soul, being air, holds us together so do earth and air encompass the whole world.

Frost (1972) supports that Anaximenes, who taught that the underlying substance of the Universe was air, likewise held that the soul was very thin or rarified air and that this substance was the thing which held the individual together. When it left, the body's disintegration set in and the body was destroyed. Air then, was a suitable candidate for the world-principle. The 'offspring' of the divine air, which in their turn produce most of the universe are generated by condensation and rarefaction, a view as has been held by Thales and that was prophetic of modern scientific theory. Wasserstein (1954) points out that winds are produced when air is condensed and rushes along under propulsion. But when it is concentrated and thickened still more, clouds are generated, and, lastly it turns to water. Wheelwright (1959) remarks that Anaximenes thought that the earth is shaped like a round table and that air encompasses everything. Just as our soul being air, holds us together, so do breath and air encompass the whole world. It seems that the world breathes.
It is a pity that we have not more knowledge of Anaximenes. Yet he enjoyed far greater prestige and exerted a great influence. More radical are the innovations of Anaximenes with regard to the shape and order of celestial bodies. The stars, not the sun, are farther from the earth, sun and moon are not rings but flat objects which float in the air just as the earth itself is borne up by air. Jammers (1954) explains that Anaximenes was the first to recognize that the moon derives its light from the sun and he gave a natural explanation of eclipses of the sun and moon, which he regarded as caused by bodies similar to the earth, revolving in the Universe. And it is in this form that the Milesian cosmology is transmitted to the Ionians of the fifth century.

3.2.4 FALL OF MILESIANS

Copleston (1946) observes that with the fall of Miletus in 494, the Milesian school must have come to an end. The Milesian doctrines as a whole came to be known as the philosophy of Anaximenes, as though in the eyes of the ancients he was the most important representative of the school. Russell (1957) ascertain that the Milesian school is important not for what it achieved but for what it attempted. It was brought into existence by the contacts of the Greek mind with Babylonia and Egypt. The speculations of Thales, Anaximander, and Anaximenes are to be regarded as scientific hypotheses and seldom show any undue intrusion of anthropomorphic desires and moral ideas. The questions they asked were good questions and their vigour inspired subsequent investigations. Swann (1934) maintains that the
philosophers of the so-called Ionian school were serious philosophers of Nature and their over-riding aim was to explain how Nature came into being.

From these meager beginning among the Milesian thinkers philosophy of Naturalism was introduced into the Western world. The way philosophy started proved to be most favourable to the development of science, for these earliest philosophers were interested primarily in scientific knowledge that is to say a knowledge about the physical world and nature, an interest which has been the centre of attention among modern scientists to the present.

**3.3 ATOMISTS**

According to Butler (1931) the ancient roots of naturalism have been much fuller body in four other men who have been called atomists, only two of whom were contemporaneous. Leucippus (494 B.C. - ) and Democritus (460 - 399 B.C.) the earliest of the four, lived in the colony of Abdara on Thracean Coast during the early part of the fifth century B.C. at about the time that Socrates needed the citizens of Athens with his questions. Epicurus (341 - 270 B.C.), more than a century later, whose career was largely subsequent to Aristotle's (384 - 322 B.C.), devoted to the ideas of Democritus. Lucretius (96-55 B.C.), though not even a Greek and born almost two and one half centuries after Epicurus, was a great admirer of Epicurus. All the four are called atomists because they conceived of reality fundamentally a matter of atoms moving in space.

Ritter (1933) believes that the essential ideas...
of Greek atomism as a physical theory are four: first, that matter comes in separate, smallest, particles which are 'unsuitable' ('atom' 'unable to be cut'), second, that an empty space exists in which these particles move; third, that the atoms differ only in shape and volume; fourth, that all change is the result of transfer of momentum by the moving atoms and such transfer can occur only by contact there in. Apparently Leucippus and Democritus were the real creative minds with whom the atomistic view of reality originated.

3.3.1

LEUCIPPUS (460 B.C. - ) AND DEMOCRITUS (460-369 B.C.)

Hecking and Hecking (1929) state that the atomic theory was the work of Leucippus and his pupil Democritus. They held that Democritus was a contemporary of Plato (427-397 B.C.) but the two schools held views so completely opposed that they ignored each other. Leucippus, a rather shadowy figure was probably born at Miletus, went to Elea and studied under Zeno (340-289 B.C.) and then returned eastward to start his school at Abdera in Thrace. These places epitomize his chief philosophical association, essentially Ionian in outlook.

Cleve (1973) tells that Leucippus was the founder and pioneer of atomism but his pupil Democritus was a greater philosopher with more universal interest. He developed the essential principles of his master in numerous fields: cosmology, astronomy, physiology, medicine, epistemology, mathematics, linguistics, agriculture and other topics. Olsson (1940) holds that Democritus, the greatest representative of the school, resolved the paradox by stating xxxxxxxxxxxxxxxx
the basic principle that there is an infinite number of homogeneous elements—atoms moving in an infinite void. The world is permanent because of the physical characteristics of the atoms and the world is changing because of their motion in space.

Titus (1968) considers that Democritus, one of the early materialists, posited that the Universe was made up of two parts: first, the plenum (from the Latin plenus, meaning 'full'), or matter, composed of an infinite number of self-moving, invisible atoms; second, the vacuum (void) or empty space. From these prodigious studies it would seem that Democritus elaborated his theories from more empirical and less educative view points than his teacher. He was a man of serene fortitude and good humour. Like Protagoras (481-411 B.C.), Democritus was a citizen of Abdera, in Thrace. Unlike Socrates, a contemporary, he wrote voluminously, though none of his writings has come directly to us. Even Aristotle is not without debt to Democritus in the field of natural studies.

The work of Leucippus the teacher, is largely obscured by the more comprehensive work of Democritus, the pupil. The ancients refer these together and their work cannot be adequately distinguished. Both are known to have come under the influence of the school of Elea. The views of the two sponsors of mechanical atomism will be discussed together, since it is impossible to separate them. Latham (1951) depicts that let us forget about the interesting problems of what exactly should be attributed to Leucippus and what to Democritus. Following the example of later
antiquity, we are going to call the common atomistic doctrine just Democritean.

According to Clark (1957) Democritus admitted that an atom could be as large as the world. Durant (1926) narrates that finally in Leucippus and Democritus, master and pupil in Thracian Abdera, we get the materialistic determinist atomism. "Everything", said Leucippus, "is driven by necessity." In reality, said Democritus, "there are only atoms and void." There is or have been or will be an infinite number of worlds; at every moment planets are colliding and dying, and new worlds are rising out of chaos by the selective aggregation of atoms of similar size and shape. There is no design, the Universe is a machine.

Tomlin (1952) holds that according to Democritus, both matter and mind were composed of atoms and these constituent atoms, though varying in shape, were formed of combinations of atomic particles, their so-called immortality being due to superior and therefore more lasting combinations than those of mortals. Nevertheless, we cannot suppose that such combinations will last indefinitely, for death will one day overtake even the most transcendent of beings, only the individual atom, then, is assured of immortality. Although its partnership with other atoms may be dissolved, it will remain free to enter into other partnerships and so on for ever. About 2350 years after the birth of Democritus his theory of the hard, indestructible nature of the atom received striking reputation in practice. Martin, Clark, Clarke and Ruddick (1941) write that Leucippus probably assumed, rather
than explicitly stated, something like the first 'law of motion'. Every atom continues in its state of motion or rest indefinitely same as it is acted upon from without.

Leucippus, boldly admits that all change is thought of as change of place, as the motion of material particles through the void. The particles, the indivisible nuggets, are real. They constitute being. The void is non-being or nothing. Together these two orders make up the world of change that is open to sense experience. To be sure, our senses cannot perceive the single atom. Only groups of many items are visible or in any way perceptible but the theory 'saves the appearances' in that it purports to recognize change as a logically respectable entity. When atoms combine, a new physical thing arises; when the atoms separate, the thing passes away, and is lost in the void. The atoms possess the properties attributed by Parmenides to the one reality of his theory. They are indivisible and changeless for the fact that they can move in empty space.

An atom is an eternal unity, the fact that reality is composed of many atoms, each possessing a form or shape of its own, does not trouble Leucippus, and he offers two reasons. Why, the atom possess one form rather than another? No reason can be assigned, and therefore we have a right to expect all possible forms or shapes, an infinity of unique atoms. Furthermore, the inexhaustible variety of birth and decay, the coming to be and passing away of observable entities, indicates an unlimited range of material from which these spring.
3.3.2 **EPICURUS (341 - 270 B.C.)**

Oates (1940) expresses that Epicurus was an Athenian of the Heraclides. In his eighteenth year, when Athenians were driven out of Sosos, he went to join his father in Calophas. Saunders (1966) contends that the property owned by him contained a garden and the school located there occasioned the calling of his followers 'philosophers of the garden'. At his death, the garden was left to his followers. He was held in high esteem and reverence by those who visited the garden. Lange (1957) pleads that Epicurus never filled any public office and yet he is said to have loved by his countrymen. He prided himself on his self-education and believed that the best way to be a leader is to live a life sufficiently worthy to command respect from others.

Zeller (1951) tells that Epicurus regarded philosophy as a medicine for the soul. His name has with justification become proverbial for a life of pleasure. Those who knew him praised his contentedness, his tenderness and goodness, qualities to which his last note, written shortly before his death to one of his pupil, bears witness. Russell (1957) remarks that the philosophy of Epicurus like all those of his age, was primarily designed to secure tranquility. He considered pleasure to be the good, and adhered, with remarkable consistency, to all the consequences of this view. 'Pleasure', he said 'is the beginning and end of the blessed life'. Patrick (1935) describes that Epicurus, founder of Epicurean School of philosophy, refined the theory and while still making the
highest good, emphasized mental rather than physical pleasures and thought that in the end the greatest pleasure could be gained by freedom from fear and anxiety and by studious avoidance of any cause of pain or worry.

Smith (1934) ascertains that drawing his metaphysics from Democritus, who had brought atomism to its most systematic form, Epicurus pictured a world in which pure chance reduced the hope of intelligence to not humble proportions. If man could improve a world, he might by retiring to the gardens, save himself from grievous hurt, and might even with kindred spirits preserve a little oasis in a vast desert of misery. Pleasure is still the good, though the surest hope is merely to escape pain. Clark (1957) conducts that according to Epicurus, the great problem of humanity was the fear engendered by religious superstition. Religion consists mainly in the belief that the gods reward and punish, especially punish, mankind. Fear of punishment in a future life makes the present life unbearable.

The understanding of these facts enables us to refer all choice and avoidance to the health of the body and the soul's freedom from disturbance since this is the aim of the life of blessedness. For it is to obtain this end that we always act, namely to avoid pain and fear. And when this is once secured for us all, the tempest of the soul is dispersed. Preservation of this Island of the soul's enjoyment was what brought Epicurus to the metaphysics of Democritus. For the view of the world proposed by Democritus, banished for him the fear of death,
one of the greatest disturbers of man's peace.

Semon (1723) explains that all that exists in the universe, ultimately, is summed up in the atoms and empty space of atoms. Atoms are original, eternal, indestructible and uncreated. Originally the atoms were in a state of downward motion induced by their solidity and weight. The universe is purely a mechanical arrangement and in some instances the law of chance still operates. There never was a creation and there never will be destruction of the real. Each atom and each group of atoms in the universe is completely independent. Human beings as instances of groups of atoms are each without any dependence upon others of their kind. The concept of universal law as accepted by Democritus is entirely omitted from the metaphysics of Epicurus. All natural processes are the product of the inner necessity inherent in the atoms in addition to the foregoing anti-theological doctrines of naturalism and mechanism. Epicurus also adhered to the Democritus' general theory of sense-perception as the basis for divining whatever truths are possible of attainment.

3.3.3 LUCRITIUS (96 - 55 B.C.)

Goodbridge (1965) maintains that the author of the great poem De Rerum Natura, on the nature of things, was the major voice in the Roman world for the atomism of Democritus and the hedonism of Epicurus. Wolff (1976) contends that Lucretius was a Roman philosopher and poet who lived in the first century before Christ, nearly five centuries after the Gileadians. Burnett (1930) depicts that Lucretius has a similar account of the matter, derived
from Epicurean sources. He defended a cosmological theory called atomism, according to which everything in the Universe, including even man's spirit, is composed of little bits of matter called atoms which are so small that they cannot be seen by naked eyes.

Jammer (1954) recalls that when the atoms are travelling straight down through empty space by their own weight, at quite indeterminate times and places they swerve ever so little from their course, just so much that you can call it a change of direction, if it were not for this swerve, everything would fall downwards like rain-drops through the abyss of space. No collision would take place and no impact of atom on atom would be created. Thus nature would never have created anything. Sambursky (1956) ascertains that according to Lucretius, material objects are of two kinds, atoms and compounds of atoms. The atoms themselves cannot be swamped by any force, for they are preserved indefinitely by their absolute solidity. Admittedly, it is hard to believe that anything can exist that is absolutely solid. The lightning stroke from the sky penetrates closed buildings as do shots and other noises. Iron glows molten in the fire, and hot rocks are cracked by untempered scorching. Hard gold is softened and melted by heat, and bronze, ice-like, is liquefied by flame. Both heat and piercing cold seep through silver, since we feel both alike when a cooling shower of water is poured into a goblet that we hold ceremonially in our hands. All these facts point to the conclusion
that nothing is really solid.

There is nothing, however, besides the atoms and void. All existing things are either combinations of these two or an event of these, Lange (1957) observes that even time has no separate existence, but is the feeling of a succession of occurrences earlier and later, it has not even so much reality as void space, but the events of history are to be regarded only as accidents of bodies and of space.

Lucretius must have been a literary genius to have taken the philosophy of Epicurus and dressed it up in such a beautiful poem as De rerum natura. Zeller (1931) writes that this work in six books contains a complete statement of Epicurean thought as handed down by Epicurus. Although written in Latin by a Roman in spirit, the elaboration of ideas about man and the world reflect almost exactly the thought of the revered master, Epicurus, who had lived almost two centuries earlier. When he alludes to the greater master, Epicurus, whose intellect surpassed humanity, he mounts into flights of praise.

He also includes in his poem the Epicurean explanation of knowledge as films of objects which get into the mind by way of the senses. In addition he has much to say about the evolutionary development which followed the hurling together of atoms from the earth and other planets. Saunders (1966) emphasises that one sample runs as follows:

"In the beginning, Earth gave forth, around
The hills and over all, the length of plains,
The race of grasses and the shining green;
The flowering meadows sparkled all aglow
With greening colour, and thereafter to,
Unto the divers kinds of trees was given
An Emausus impulse mightily to shoot,
With a free rain, aloft into the air.
As feathers and hairs and bristles are begot
The first on members of the four foot breeds
And on the bodies of the strong-es-winged;
Thus then the new Earth first of all put forth
Grasses and shrubs, and afterward begot
The mortal generation, their unspiring.
Innumerable in modes innumerable
After diverging fashion. For from sky
These breathing creatures never can have dropped,
Nor the land-dwellers ever have come up
Out of sea pool salt. Now true remains
How merited is that adopted name
Poetry of earth - "The Mother" - since from out
The earth are all begotten."

3.4 THOMAS HOBBES (1588-1679)

In the words of Fuller and Memurrian (1953) it is
said that Bacon (1561-1626) in the last years of his life at
Oxford was sometimes attended in his walks by a
youngman who took down his thoughts from dictation. This
young man was Thomas Hobbes, by whom Bacon's naturalistic
and materialistic learning in science were given
metaphysical and scientific form. Smiljan, Dietrichson,
Keyt and Miller (1952) remark that late in...
life Hobbes returned to classics and translated Iliad and Odyssey. He was acquainted with many of the intellectuals of this period including Bacon, Ben Jonson and Galileo.

Butler (1951) states that a full and adequate history of Naturalism could by no means make a grand leap from Lucretius (96-55 B.C.) in the first century before Christ to Thomas Hobbes (1588-1679) in the Seventeenth Century. It is more significant that in early modern times there was a continuance or resumption of the Naturalistic tradition in Philosophy. There is not as much unity of pattern in Hobbes (1588-1679), Rousseau (1712-1778) and Spencer (1820-1903) as in the ancients; Leucippus (494 B.C.), Democritus (460-370 B.C.), Epicurus (341-270 B.C.) and Lucretius (96-55 B.C.); but there is a unity and a common ground and it is antecedent to one of the world views which is very common today, while now this world view often assumes in one philosopher a realist theory of knowledge and in another a pragmatic, yet it continues to be influential world view which is properly called Naturalism.

Dibney (1888) depicts that the Naturalistic view of the universe is Hobbes' second major contribution to modern philosophy. He himself tells the story of how he arrived at it. According to Hobbes, in 1640 he was once in company, when somebody asked what was the nature of sensation. Hobbes, who was unable to think quickly, did not pretend to answer the question. But he went away and thought about it a great deal. He finally came to
the conclusion that the only way in which one perceives anything in the outside world is when it is in movement.

Having once established the fact that the Universe is solely corporeal and materialistic, he set it in motion. According to Bronowski and Madlish (1960), Hobbes remarks when a body is once in motion, it moves, unless something else hinders it eternally. Therewith, according to Hobbes, these bodies in motion strike our sense organs and set up further motions within us. It is these internal motions which we perceive as sensations. Kaufmann (1961) conducts that unlike Bacon (1561-1626) and Descartes (1546-1650), Hobbes is often considered a one-book philosopher though in the course of his exceptionally long life he wrote prolifically, his enduring fame is tied to a work he published in his sixties, Leviathan.

Hobbes clearly had taken the physics of Galileo (1564-1642) as his model for the construction of a metaphysics of materialism and naturalism. It was this metaphysical counterpart to the seventeenth-century physical world which served as a basis for a large part of future thought. Weber (1996) believes that Hobbes states a truth already known to Democritus (460-370 B.C.) and Protagoras (451-411 B.C.), the highly important truth of the wholly subjective character of perception that what we perceive-light, for example, is never an external object, but a motion, a modification taking place in cerebral substance. We need no further proof of this than the fact that light is perceived when the eye receives a more or less...
powerful blow, the sensation is merely the effect of the excitement produced in the optic nerve, and what hold for light in general may be said of each particular colour, which is but a modification of light.

Adams (1960) claims that like the ancient naturalists he conceived nature as an affair of bodies moving in space. He was not, however, an atomist for he did not agree that anybody could be so small that it could not, even so, be divided and made smaller. A body he defined as a thing which exists in and of itself and has no dependence whatsoever upon our thought. Bodies exist outside of us and do not depend on any relation to us. By space he meant a place outside the mind which can be filled by an object.

Dover (1927) considers that when we turn to the problem of causation in Hobbes, we find that he did not believe in an a priori concept of cause and effect. According to him we deduce causal laws from the changes of motion in the physical world. If motion ceased, we would have no adequate understanding of causal relationships. But fortunately, Hobbes said that the motion of the physical world cannot be destroyed. It makes no jump and it is present everywhere. Hence the causal law can be applied with complete validity to our study of science.

Brinton (1950) tells that although Hobbes agreed with Plato's Republic in basing political theory upon the nature of man, he developed his own philosophy of naturalism, the belief that ultimate
reality consists exclusively of inert extended substances. Whatever exists is matter and whatever changes is motion. Implied in Hobbes' Naturalism is the doctrine which was later to be termed epiphenomenalism, the theory that mental or spiritual entities are not realities in their own right but merely by-products of matter which perish when their material base is destroyed.

But there is really another item in Hobbes description of Nature, this is time. Because the movement of bodies in space gives us a phantasm, a percept, or a mental image of time. Time is one aspect of experience which we have when we see a body passing out of one space into another. It is the experience of 'before' and 'after' in motion. Between the 'before' and 'after' there is some kind of duration which is different from either space or motion. This attempt to represent the description of Nature offered by Hobbes is a sample of the legitimate subject matter of philosophy as Hobbes defined it. Philosophy for him was natural philosophy. It is properly concerned, he held, with the properties of bodies.

Hobbes evidently gave some attention to the knowledge problem. The most elemental beginning of knowledge, he recognised as the sense impressions or phantasm, as he called them, with which Nature makes its impact upon us. Once the impression is made on the sense organs the movement is unquestionably an inward movement, a typical motion of bodies, one making an impact on another successively, until the innermost part
of the organism is reached.

3.5

JEAN JACQUES ROUSSEAU (1712 - 1778)

Frost (1959) expresses that a bomb was dropped into the midst of this brilliant group of thinkers by Jean Jacques Rousseau. Ross (1947) contends that Rousseau was indeed, the outstanding champion and exponent of 'Naturalism' and perhaps the most prominent 'Naturalist' who ever wrote on education. His Naturalism was a reaction to conventionalism and artificiality that overlaid all aspects of life in his days. He says in *Emile*, 'God makes things good, man meddles with them and they become evil'.

Rousseau certainly wrote things as he felt. As a philosophical principle one may say that man ought to be born free but as a sociological observation it is obvious that man is certainly not born free by nature. To Rousseau, society was not a 'natural' but an 'artificial' production, the outcome of contract. According to Rogers (1960) Rousseau pleads that society, instead of being a natural expression of needs of man's nature, is only an arbitrary contract which men make for the sake of certain external advantage. In the words of Cunningham (1940) Rousseau maintains that evil enters into the life of man by his contact with social institutions. Man is corrupted by life in society. In consequence, nature and society were opposed and what was natural was 'good' and what was artificial or conventional was 'evil'. This is another element in his naturalism. To live according to
Nature is to live according to rational principle or reason and he who obeys his conscience is following nature. Again in the Emile, Rousseau says:

"Let us lay it down as incontrovertible fact that the first impulses of nature are always right."

Why is Rousseau called Naturalist? Because the first thing is his preference for the quietude of the simple life lived close to Nature, which he held in common with the ancient naturalists. The second is his revolt against society which caused him to glorify Nature and her ways in contradiction to the ways of society. His glorification of Nature has had the effect of promoting naturalism, particularly in politics and education.

Bernard (1969) states that Rousseau succeeded Voltaire (1696-1778) as the paramount philosopher of the French Enlightenment. Earlier he had come under the influence of Voltaire's point of view but later became its vigorous opponent. Rousseau condemned Hobbes' (1588-1679) theory that man is innately corrupt, insisting, on the contrary upon the natural goodness of human nature. Man is born both innocent and good as well as free and equal. In the words of Durant (1926) Rousseau argues that nature is good and civilization bad. By nature all men are equal, becoming unequal only by class-made institutions and that law is an invention of the strong to chain and rule the weak.
Kaufmann (1961) depicts that Rousseau's problem is to explain how a just society can arise. He was convinced that the existing societies of his day were corrupt. They made men dependent rather than free. In the words of Limaye (1960) Rousseau holds that human institutions are mass of folly and contradiction. Men are devoured by our towns. Sullivan (1970) believes that it seemed to Rousseau that civilization is a huge mistake, having taken man further and further from the primitive state of innocence and happiness; history is the story of an infinite regress, not of progress. Powell (1962) observes that through the long march of civilization, the life of men as Rousseau saw it, has become muffled in system of knowledge, system of government and conventions of society.

Cobban (1934) narrates that the idea of nature was for Rousseau what it had been for the Greeks, a way of maintaining an ideal of human nature. The abandonment of this idea of nature, the identification of the natural with primitive—not the ideal primitive of pastoral imagination, but the actual primitive of anthropological investigation—was therefore something more than the end of an illusion. Rousseau followed the tradition of ancient naturalists in one important respect. This was their desire to remain aloof from the disquieting conflicts and struggles common to human society and to find comparative quiescence in a simple life lived close to nature.
Being a part of a genteel household which was maintained by a pension, he was free to commune with Nature, work at his music and quietly enjoy life. According to Roche (1973), Rousseau writes, "I have retired within myself and, living between myself and nature I taste an infinite sweetness in thinking that I was not alone, that I was not conversing with a being insensible and dead. The intrigues of Parisian Society, the gross artificialities of what was regarded in Paris as civilized and cultured living—these provided a disgusting contrast to a quiet life in the country where one could be close to Nature, even if he were a peasant." Anchor (1967) refers that Rousseau did not praise primitive man as such. What he praised in primitive man was solely the transparency of his nature which acts as a curb to vice where men can see through one another, look into each other's hearts, deception is difficult and also unnecessary.

This brings us to recognition of the original element in Rousseau's naturalism. This is that it was a revolt against the artificiality and corruption of human society. In the words of Sahakian and Sahakian (1965), Rousseau points out that a cursory glance at surrounding civilization is sufficient to warrant the conclusion that it is nature corrupted. Stewart (1968) points out that his educational views were a product of his discontent with society as a whole. Emile was the spearhead of a protest against
the stifling formality and elaborate insincerity of the society.

Rousseau glorified Nature not as an eternal and indestructible order of atoms moving in space, as did the ancients. Instead, he exalted Nature as that ever dependable order which is contrasted with human society, in variety of ways. Nature is dependable, society is fickle. Nature is good, society is evil and crafty. Nature offers us freedom and necessity if we live close to her, society offers us tyranny and authority. Nature has smooth-flowing rhythms which choose their own time, society is full of hurry and premature actions prompted by the whims and ambitions of foolish people who do not know Nature.

3.6 HERBERT SPENCER (1820 - 1903)

Curtis and Boulwood (1966) contend that Spencer is almost unique in the history of philosophy because of his attempt to construct a complete system of speculative thought in which everything would fall into place under the governance of the principle of evolution. As early as 1850 he published the 'Programme of a system of Synthetic Philosophy' and devoted the rest of his life to working it out in detail. Although he was hampered by constant ill-health, he resolutely adhered to his plan and before his death he had written works on biology, psychology, sociology and ethics.

Elliot (1917) considers that Spencer's position in philosophy is a comparatively isolated one. He received little from the writings of previous philosophers.
but much from the science of his own time. Nevertheless his philosophical affinities were with the naturalistic and even the materialistic thinkers of the past, rather than with the idealists or the metaphysicians. Curtis (1959) recalls that Spencer may be regarded as one of the chief exponents of the views of the naturalistic school of philosophy in the nineteenth century. Baskin (1966) contends that Spencer, the greatest intellect since Aristotle was also credited with being the father of evolutionism and social Darwinism.

Spencer is the great philosopher of evolution. Collins (1901) depicts that as regards the doctrine of evolution, Spencer early in life rejected the supposition that the Universe was a thing created and stationary. He perceived that all Nature was in a constant state of change or flux. He sought to develop a philosophic theory based on the findings of Darwin (1809 - 1882) and other biologists. Hocking and Hocking (1929) maintain that the great era of Naturalism is, as one would expect, the century of Darwin and Spencer, when natural law was first applied with extra-ordinary success to the world of living organisms and the principles of evolution in biology were extended to the history of the universe. Frost (1959) pleads that Spencer accepted the doctrine that each individual had the right to preserve himself. Indeed he saw in nature a struggle in which the fittest survived and the less fit perished. Thus, men must be
free to struggle and prove their fitness to survive.

Teggart (1942) ascertains but Spencer's notion of biological evolution was developed prior to and independently of Darwin's. It is interesting to observe that Darwin accepted the doctrine of progressive change, a postulate of the theorists of human society and history. The inhabitants of the world at each successive period in its history have beaten their predecessors in the race for life, and are in so far higher in the scale. This view of evolution is based upon a number of presuppositions: (I) the indestructibility of matter (II) the continuity of motion and (III) the resistance of force. These presuppositions may be said to imply (1) force that is unchangeable in quantity (2) force that cannot be created out of nothing or disintegrate into nothing (3) the law that everything moves along the lines of least resistance (4) the assumption that the law of the continuous redistribution of matter and motion holds good for change in nature and (5) the assumption that everything in existence is subject to the law of the entire cycle of changes.

Evolution is always an integration of matter and dissipation of motion. This change is the arrangement of matter and is accompanied by a parallel change in the arrangement of motion. Spencer (1910) writes that having unified the two opposed processes under the law, he now names them evolution and dissolution. Evolution under its simplest and most general aspect is the integration of
matter and concomitant dissipation of motion, while
dissolution is the absorption of motion and concomitant
disintegration of matter. This formula covers the whole
history of everything that has a history and indeed, the
whole process of knowable reality.

Sullivan (1970) tells that as a confirmed
mechanist, Spencer attempted to reconstruct all phenomena
with the twin elements of matter and motion, the existence
of these elements is governed by universal laws that apply
to the inorganic, the organic, and the super-organic
domains at once. All the laws, however, are deducible
from one postulate the 'persistence of force', or, in
other words, 'the law of the conservation of energy'.

Beers (1889) expresses that Spencer begins his exposition
by affirming that the difference between mind and matter,
or between subject and object, is the widest and most
fundamental difference that the human intellect can
grasp. He then proceeds to vindicate the doctrine of the
'Indestructibility of Matter'.

Warner (1913) depicts that since matter is
only known to us through the force which it exerts upon
us, the indestructibility of matter implies the indestructi-
bility of the force exerted by matter. The continuity
of motion is dealt with on similar lines. According to
Borsodi (1963) Spencer believes, but the matter and
motion existing throughout the universe was not stationary,
it was continually undergoing change and the formula which
he sought was one which summed up in a single law the
characteristics of this change in every department.

Fothergill (1952) points out that Spencer begins his philosophy with the recognition that phenomenal things, as presented to us, are all that we can know. The cause of these phenomena is unknowable. But there is a cause, an Absolute Being. Behind all phenomena, of course, we do make judgments about it. We conceive it as a force, as power causing all that we know. Actually we can know nothing about it. It is the unknowable, all that we can know are the inner and outer expressions of the Absolute.

3.7 CONCLUSION

Oates (1940) summarizes that the Western European Civilization owes to its Greek ancestors one of its greatest debts, because from them sprang Naturalistic Philosophy, the speculative spirit of inquiry into the mysteries of life and the Universe. Sambursky (1955) writes that in its earlier stages the orientation of philosophy was to the external world. Thales (624-530 B.C.), the traditional founder of this type of speculation, and his immediate successors, Anaximander (611-547 B.C.) and Anaximenes (586-525 B.C.), sought to solve the problem of the nature of matter, the constitution of the world or universe. In a sense, they were, what we might call today physicists, rather than philosophers, and their inquiries usually resulted in the conclusion that all matter could be reduced to one or more fundamental elements as substrate from which the external world or universe was ultimately derived.